EDITORIAL

OKLAHOMANS care naught for expense when a principle is involved. They actually threw eggs at Senator Reed when he attempted to address them on the subject nearest his heart.

AEROPLANES for transportation of supplies are being considered by some Mexican mining companies operating in the vicinity of Mazatlan, whose properties are far from any road. A curious feature of the plan is that one of the principal advantages expected is that larger pieces of machinery can be carried by aeroplane than over the rough pack-trails that at present furnish the only means of communication.

AMERICAN and other foreign trade-marks in Japan have been assured full legal protection by a decision of the Japanese Supreme Court in the case of the Miller Lock Company of Philadelphia v. the Crown Lock Company of Tokyo. A verdict was rendered in favor of the Miller company, which claimed infringement by the Crown company of a trade-mark registered under the Japanese laws. The decision is particularly far-reaching since the infringement alleged consisted not in making an exact copy of the trade-mark but in imitating its general form in such a manner as to deceive the public.

AN International Trade Conference is to be held at Atlantic City during the week beginning October 20. Delegates from Great Britain, France, Italy, and Belgium, as well as the United States are to be present. The conference was originally scheduled to commence September 29, but delays in the departure of some of the foreign delegates compelled the postponement. The topics for consideration include the economic readjustment of the European countries, the financing of foreign credits, the promotion of fair play in international commercial competition, and the all-important subject of the high cost of living.

KEY industries have been listed provisionally by the British Board of Trade. Such industries are to be protected against foreign competition even at the cost of complete control of importations. The list is of special interest since similar measures are likely to be taken in the United States so that in case war or other disaster interferes with importations, our industries in general will not suffer because of the lack of certain special products. The list includes coal-tar derivatives and other dyes and chemicals, optical glass, scientific glassware, illuminating glassware, laboratory porcelain, scientific instruments, potassium compounds, tungsten powder and ferro-tungsten, zinc oxide, magnetos, and gauges.

'OUTSIDE AGITATOR' is the charge frequently made by employers against union officials during labor disputes, and it seems to have considerable foundation in the present steel strike. While there are frequently good reasons for having representatives of labor that are not actively engaged in the industry they represent, still it would seem obvious that they should have first-hand knowledge of that industry. Testifying before the Senate investigating committee, Mr. John Fitzpatrick, chairman of the committee conducting the steel strike, admitted that he had never been employed in a steel-mill, and that the nearest he ever came to the steel industry was in plying his trade as horseshoer. His knowledge of conditions in the mills has been mainly derived from hearsay at union meetings.

A 'LABOR CONFERENCE' will meet at Washington on October 6 upon the invitation of President Wilson to consider industrial unrest, the high cost of living, and kindred topics. The delegates have been chosen as follows: five by the United States Chamber of Commerce, five by the National Industrial Conference Board, of which most national manufacturers' associations are members, three by investment bankers, fifteen by the American Federation of Labor, three by organizations of farmers, and fifteen appointed by the President to represent the public. While criticism might be made of the division of representation, the President has certainly tried to make it inclusive. Lacking the gift of prophecy, we are unable to predict what recommendations this conference will make, but we venture the statement that they can make no recommendation more practical than the suggestion by a committee of the New York State Federation of Labor for a six months' truce on all strikes to give us all a breathing-spell and a chance to catch up on production.

STATISTICS of secondary non-ferrous metals recovered during 1918 as recently published by the United States Geological Survey indicate the importance of that branch of the scrap-metals industry. Including the estimated copper content of the scrap-brass, 352,670 short tons of copper were recovered. The recovery of zinc, including the zinc content of the scrap-brass, was 120,590 tons. Secondary lead amounted to 97,100 tons, aluminum, 15,050 tons, antimony, 5226 tons, and tin, 23,837 tons. Over 3000 tons of the tin was recovered at detinning plants from the humble tomato-can and his various big and little brothers. The average recovery of tin per ton of old tin-coated containers was 30 pounds. The average recovery per ton of clean tin-plate scrap was 36 pounds.

Generated on 2024-09-30 01:57 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

History Repeats Itself

The Los Angeles 'Times' has made the interesting discovery that one of the ablest advocates of the adoption of the Constitution in 1787 was a Mr. Wilson of Pennsylvania, while one of the most vehement opponents of adoption was a Mr. Johnson of Connecticut. The Johnsonian arguments are particularly interesting. He wanted to preserve the integrity of the State governments; he was not going to consent to go into any government where the State of New York would have six times as many votes as Connecticut. New York was a polyglot State; her Dutch population was quarrelsome; she would be getting into war after war, and Connecticut would have to do the fighting. New York's preponderance in the House of Representatives would enable her to dictate how many men Connecticut should raise in case of war and how much money Connecticut should contribute. The sons of Connecticut would be sent all over the world at the behest of New York, and Connecticut would be powerless to prevent it. How familiar it all sounds!

Employers' Associations

In another column appears a summary of the activities of the Retail Research Association, as given by the president, Mr. Alvin Dodd, at a recent meeting of the local Employment Managers' Association. This Association appears to be unusual in other ways besides the large capital controlled by its members. Too often an association of employers, whatever its ostensible object, devotes practically all its attention to one activity, namely, the combatting of labor demands, reasonable or unreasonable. The members of the Retail Research Association, on the other hand, have recognized that they have many common problems, and that the expenditure in research of a fraction of the money any one of them would risk on some change in the public taste might easily help in the solution of these problems. Questions of buying, accounting, and selling all came within the Association's activities. However, the character of this Association's membership and the fact that only one member was allowed in each community, puts it in a different class from most business associations in manufacturing lines. The attitude of the Retail Research Association toward labor problems, is, however, of more direct interest. These distributers of materials recognize that, compared with the manufacturers, they have had relatively little labor trouble, but instead of congratulating themselves upon this fact and quietly going to sleep, they are busy studying the needs and aspirations of their workers so that these may be satisfied if reasonable; thereby avoiding labor disputes except when demands are unreasonable and to be in a position to state their side in such a case. If such a spirit had been the rule among employers ten years ago, there would not be so much unrest today. That there is no use crying over spilt milk is all the more reason for making every effort to save what remains in the can.

Reversion of Type

Centuries ago, when Europe was even more disorderly than it is now, the various feudal barons carried on their private wars without regard to the suffering inflicted upon innocent third parties. Probably many of these men had the decency to regret the hardships they caused, but they would have indignantly denounced the suggestion that their so-called inherent right of private vengeance should be relinquished. It took much hard work and a good many lives to establish a respect for law. Today, in this country at least, and we trust soon again throughout the world, the man who tries to exercise his right of private vengeance lands before long in jail or in an asylum. We all recognize that the law sometimes fails to do exact justice, but that, in the long run, we are better off than if we tried some other method. Adherents of the doctrine of the superiority of so-called private rights to public interest have, however, shifted their activities to another field. Recently, Mr. Glenn E. Plumb, author of the Plumb plan, in testifying at Washington before a Senate committee, denounced the anti-strike provisions of the Cummins railroad bill, which would substitute arbitration for force and private war. He advocated the strike as an inherent right, although he admitted under questioning that a two-weeks' stoppage of railroad transportation would mean disaster and starvation to the people of many cities. Mr. Plumb is an instance of what the biologists call 'reversion to type' and the stock-raisers call 'breeding back'. It may well be that our descendants will look back upon him and his kind in the same way as we look back upon the robber barons.

Getting Acquainted

Two of our articles this month deal mainly with methods for obtaining better acquaintance between employer and employee. 'Sending Them to Work With a Smile' describes the recreational and other features of the program the San Francisco Young Men's Christian Association is 'putting over' in many industrial plants in this vicinity. Probably all the members of the local association of employment managers whose meeting is reported in this issue, would agree that, while their principal function is commonly supposed to be hiring and firing, their most useful activity, and one which should underly hiring and firing as well as all other functions, is the promotion of better relations between employer and employee. Most labor troubles, like most other troubles, if traced far enough back, arise in a lack of understanding between the parties concerned. The employee sees the employer as a bloated plutocrat fattening off the product of his toil while he gives him a pittance, and the employer thinks he has a bunch of clock-watchers on the payroll whose only thought is to deliver the minimum of work for the maximum of pay. Neither of these assumptions is true, but there is just enough truth, say about 3%, in them, to keep alive the other 97%, which is plain lie. As a matter of fact, the great majority of both employers and employees are just ordinary men, with an

Generated on 2024-09-30 01:53 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

ordinary man's faults, one of which is disinclination to take trouble to learn the other fellow's side, and an ordinary man's virtues, one of which is willingness to see the other fellow's side if it is properly presented to him. But how is the employer in a large establishment to know the employee's side or the employee to know the employer's if they do not get acquainted? It is encouraging at the present time to note the efforts that are being made by both employers and employees to get acquainted.

Vocational Education

A statement has recently been issued from the office of Mr. Edwin R. Snyder, State Commissioner of Vocational Education, showing the distribution of the $52,128 of Federal and State funds available for trade, industrial, and home economics classes under the Smith-Hughes Act for the year ended June 30, 1919. Of this amount, not more than two-thirds, or $34,752, could be expended for other than part-time courses. The sum of the amounts available for individual classes under the other provisions of the Act being slightly in excess of this total, a pro rata apportionment became necessary. On the other hand, while $17,376 was available for part-time classes, there were valid claims for only $7312, $5535 of which was for classes in home economics. In other words, $10,064 which might and should have been used for part-time classes in, say, the metal trades, remains unexpended because of the apathy of the local school authorities and the general public toward vocational education and is now no longer available. Turning to the distribution of the entire fund, we find that $7302 was apportioned to classes in home economics and $34,762 to trade and industries. Of this amount about $26,000 went for classes in the metal trades, using this term broadly to include even such subjects as automobile repairing and electrical work. By showing energy and a progressive spirit, Alameda and Los Angeles counties have obtained the lion's share of this $26,000, the amounts being $8000 for Alameda and $12,000 for Los Angeles county. San Francisco received only $298.82, which was for classes at the Irving M. Scott school in co-operation with the Bethlehem Shipbuilding Corporation. This was less than was apportioned to either Fresno, San Jose, Stockton, Mill Valley, or Santa Barbara.

Getting the Facts Across

Much of the industrial unrest plaguing us at present is caused by the fact that so many employees believe the concern for which they work to be making unjustifiable profits and themselves to be receiving but a small proportion of the products of their labor. To a large extent, the employer has only himself to blame that this belief is so prevalent. He has let the Bolshevik agitators do all the talking, and has neglected to take steps to get the facts 'across' to his men. This is an excellent field of activity for the house organ for employees, not the house organ for customers, which should be a different kind of publication. Some house organs are doing a little in this line, but it is usually very little. Why would it not be possible in most plants to furnish each employee with a monthly statement of the company affairs, whether by means of a house organ or by an enclosure in the pay-envelope? Such a statement could be for the last month for which records are completed, and could summarize, stripped off all book-keeping camouflage, the condition of each department of the business, describe the work now in the shops together with its ultimate destination, and perhaps discuss future prospects. In special cases, it might be inadvisable to make some of this information public, but this would seldom happen. The old idea of 'business secrets' is getting out of date anyway. Stockholders are, or should be, informed regarding the affairs of the enterprise in which they have invested their money, and employees have the same rights as stockholders. Irrespective of questions of abstract right, it is good policy to see that the agitator does not do all the talking.

The Steel Strike

As we go to press, the outcome of the steel strike is still in doubt. Indeed, the reports received as to its progress indicate that it is difficult for any observer to be impartial. A few facts, however, stand out clearly. The unions have not succeeded in tying up the industry, although they have compelled a number of plants to close, at least temporarily, and many others to operate with reduced forces. There is no means of knowing just how successful was the organizing campaign of the few months immediately preceding the calling of the strike, but it seems probable that most, if not all of the union members went out. Many non-union men also left their work, but it is impossible to tell what proportion of these did so willingly, and how many did so because of intimidation. With the development of measures for preserving order in the mill-towns, this latter class are returning to their jobs. In addition to the men actually on strike, there are many men idle because they belonged to a small minority of loyal workers in plants that had to close down. Reports from the various districts indicate that Birmingham and New England and eastern Pennsylvania are practically unaffected, Chicago and Youngstown seriously crippled, while Pittsburgh, Cleveland, and Buffalo are debatable territory. In general, it would seem as if the unions would have to make decided gains in order to win, while the companies are in a position to 'sit tight' and hold what they have for a long struggle if necessary, with excellent chances of winning back many of the men now on strike. Two important outside indications point to the ultimate failure of the strike. One is that violence, usually the sign of weakened morale on the part of the strikers, commenced on the first day, and the other is the strength shown by the securities of the various steel-companies on the stock-market. It seems reason-

Generated on 2024-09-30 01:50 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

ably certain that the more conservative leaders in the American Federation of Labor, while they undoubtedly would like to see the steel industry unionized, were not in sympathy with the calling of a strike at the present time, particularly in view of the labor conference that is to meet at Washington this month. Failure of the strike, besides being a victory for the companies, will, in a sense, be a victory for the conservative labor leaders over such radicals as Messrs. John Fitzpatrick and William Z. Foster. In fact there are reasons to suspect that the real object of the strike leaders is not recognition of the unions but the overthrow of our entire economic and political system and the substitution therefor of something resembling the present Russian model. Mr. Foster himself wrote a book on 'Syndicalism' in which he advocated the most extreme I. W. W. methods. It is true that this was several years ago and he claims to know better now, but does he? In this connection it is interesting to note that most of the American employees of the steel companies have remained at work, while a large proportion of the foreigners, particularly the unnaturalized ones, have struck. While American citizenship or even American birth does not necessarily imply belief in American ideals or opposition to syndicalist methods, our worst industrial unrest seems to be found among the more ignorant of the foreign-born, directed only too often by educated American citizens, who ought to know better. Real Americanization should prevent this.

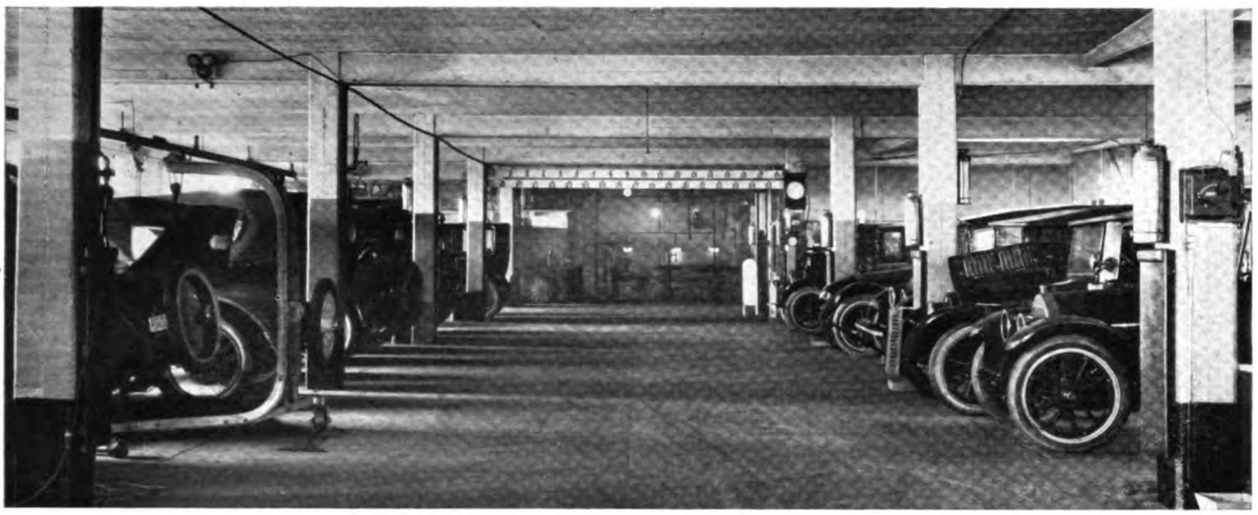
Hoover and Bolshevism

The Nation's most distinguished private citizen has returned to California. When he left here, five years ago, he was known only as a prominent and successful mining engineer. He returns with a world-wide reputation as an administrator, a statesman, and, shall we say, a philanthropist. After reading the reports of Congressional investigations of where some of our Liberty Bond money went, it is refreshing to hear of a man who was given $100,000,000 of Government money to spend practically as he saw fit, and who brings back $85,000,000 or $90,000,000 of it, with vouchers for the rest. A man that can do these things is worthy of attention, particularly when he speaks on subjects of general interest, but about which he has special knowledge. In an address delivered at a dinner given in his honor at New York, shortly after his arrival from Europe, he called attention to the object-lesson of the absurdities of Socialism furnished by the course of events in Russia, Hungary, and, to a lesser degree, in some other European countries. He stated that, in his opinion, Bolshevism and Socialism have already done their worst, and that Europe is now on the road to economic recovery, provided that she gets peace through the adoption of the League of Nations. He also called attention to the importance of America's taking to heart this practical demonstration of the bankruptcy of Socialism, and avoiding the commission of the same mistakes that have cost Russia so much in both life and property.

The Shipyard Strike

Shipyard workers in the yards of the San Francisco Bay district struck on October 1 because of the refusal of the yards to pay the increase of wages of eight cents per hour as provided in the agreement drafted by representatives of employers and employees at the conference in August. Up to September 19 it was commonly supposed that a strike would be averted on the expiration of the former agreement on October 1, although three of the six steel-ship yards in the Bay district had not ratified the agreement. On September 19, however, a message came from the Emergency Fleet Corporation forbidding the yards to pay the increase, even out of their own funds. This order was later reversed, permitting the employers to pay the increase from their own pockets, but the strike had already been called. It is doubtful whether or not trouble could have been averted if the Fleet Corporation had been more expeditious in reversing itself. In any case, at the time of going to press, the shipyards of the Bay district were closed by the strike, together with all the outside shops that had not agreed to pay the increased wage-scale. As the agreement has technically been violated, the labor leaders now ask for the original 20-cent increase. Strike conditions also prevail in the two yards in the Los Angeles district and at the yard of the Todd Shipbuilding Company at Tacoma. On the other hand, Portland and Seattle yards are operating as usual, although the Portland yards are seriously inconvenienced by a strike in boiler and machine shops supplying the yards. While the shipyard employees have good cause for irritation at the withholding of a wage-scale they had good reason to expect would be granted, it would seem for several reasons that a mistake has been made in calling a strike at this time. In the first place, conservative labor leaders as well as representatives of the long-suffering public are taking the stand that new strikes should not be called until after the Labor Conference, which meets at Washington on the 6th of this month, has had time to formulate recommendations. Second, and still more important, is the question of competition with Eastern and foreign yards. The present Government contracts, large though they are in the aggregate, are of relatively small importance compared with the question whether the shipbuilding industry is to survive on the Pacific Coast, or whether the really important work is to go elsewhere, leaving only an occasional rush repair job for the local shops. It is a question of production costs, which must be kept as low as, or lower than, costs in other yards, if the work is to come here. The same reasoning applies to the branches other than shipbuilding. It is all a question of choice between having thousands of men in the shops working for good wages but wages that will permit competition with other districts, or having hundreds of men working for perhaps slightly higher wages on jobs of such a character that it does not pay to send them elsewhere. Neglecting for the moment the interests of the community as a whole, which of these alternatives is for the best interests of the individual mechanic?

Generated on 2024-09-30 01:53 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN



PART OF REPAIR-FLOOR. NOTE BOARD IN REAR WITH MECHANICS' NUMBERS ON IT

Automobiles Repaired Without Pain

AUTOMOBILE owners have the idea that as soon as they drive their cars across the threshold of a repair-shop they are in the hands of robbers, and too often they are right. A little knock somewhere is transformed into a repair bill as long as one's arm and the owner has a sneaking idea that all the time charged against him was not put in on his car. Although the robber garage-men are becoming fewer and fewer, there is still a tremendous amount of dissatisfaction among car owners with the service they get in repair-shops, so much so that some garages have abandoned the repair department. A large part of this dissatisfaction is caused by misunderstanding and lack of system, rather than just plain robbery, but the dissatisfaction is there nevertheless. Where there is no system, the owner knows that he is likely to pay for the work on somebody else's car. It works this way: A mechanic starts to work on one car and while he is so employed, Mrs. Jones drives in to have some little adjustment made. The mechanic is called off the job on which he is working to make the adjustment, which is probably classed as service and no charge is made. Perhaps it takes only ten or fifteen minutes, but his time is being charged to his original job and the owner of that car pays for the service to Mrs. Jones.

For the purpose of finding out how such repair work is handled in a large successful shop, a call was made upon T. J. Beaudet, master mechanic for Don Lee's repair-shop, and he very kindly described the system he uses, and which works satisfactorily under their conditions.

To begin at the beginning, the customer brings his car into the service department and the trouble-chaser looks it over and possibly rides around the block in the car to diagnose the trouble. This is considered service and no charge is made. If there is work to be done on the car a charge blank is made out in triplicate (see page 436). Each operation is listed separately, and then the car and the blanks are sent to the repair-floor, where only the repairs as specified on the blank are made. When the clerk on this floor receives the blank she makes out a separate tag for each operation that is to be done to the car and then these tags are distributed to the departments or mechanics who are most fitted to handle the particular job. The instructions are never given verbally but are always written on a tag. When a mechanic begins a job he rings in on the time-clock and he rings out when he finishes. He then enters his time on the charge-blank and goes to the idle-bench where he stays until the clerk gives him another job. The clerk is provided with an index which lists all the different kinds of repair jobs that are done, and under each job-heading are listed the names and numbers of the mechanics who are capable of doing this particular job.

The time between ringing out on one job and ringing in on another is entered on the idle-time card, and that time is charged to overhead.

The mechanics are not paid for the time on their time-card, but for the time as entered on the charge-blank and on the idle-time card. The total time as entered on the charge-blank and on the idle-time card much check with the mechanic's individual time-card.

There were a couple of men sitting on the idle-bench reading magazines and the desire was expressed to know more about it, its purpose and why it paid. "In the first place," Mr. Beaudet said, "I want to have plenty of men on hand to do the work and I would rather have a man sitting here reading a magazine than making work for himself on some car just to keep busy. The instruc-

Generated on 2024-09-30 01:51 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

DON LEE—REPAIR DEPARTMENT—CHARGE BLANK

LABOR RECORD..... Must be assembled with Material Record bearing same number before rendering invoice.

IMPORTANT—Time stamp this charge blank on reverse side.

DELIVERY DATA | TERMS | STALL NO. | SERIES NUMBER | POSTING NUMBER | Posted Ledger | Entered Stock

Owner's Name | Motor No. | Date of Order

Address | Model | Date Billed

Phone | Year or Type | This Order Taken by

Top Dept. No. | Garage No. | Trade Name of Car | Time Distributed by

Paint Dept. No. | Mileage | Verified by

Inspection No.	✓	INSTRUCTIONS—DESCRIBE EACH OPERATION SEPARATELY	Inspection No.	✓	INSTRUCTIONS—DESCRIBE EACH OPERATION SEPARATELY

Ordered by | Order No.

SYMBOL OR CATALOG NO.	QUANTITY	MATERIAL USED IN REPAIR DEPARTMENT DESCRIPTION OF MATERIAL	NAME OF WORKMAN WHO OBTAINED MATERIAL	PRICE	Mark or Acct. No.	HOUSE CHARGE AMOUNT	CHARGE CUSTOMER AMOUNT

Total from Material Record

Total Labor

Total Charges

The charge blank, first of three sheets making up the charge blank set. The reverse side of this sheet is shown below. The second sheet is a duplicate of the top half of the first sheet and goes with the car, the repairs are checked off as they are made, and when all the jobs are checked off the floor-man takes the car to the delivery floor. The third sheet is a material record for the stock-room, and the total charge therefrom is entered at the foot of the first sheet as one of the sub-totals. The material record at the bottom of the first sheet is for the store-room in the repair department. 'House charge' and 'charge customer' mean cost price and selling price respectively. The top department, paint department, and garage have records of their own. If work is to be done by these departments the number of the order is put on this record as a convenience to the bookkeeper.

tions are to do the work specified on the tag with dispatch and then report back to the idle-bench. In this way the customer is not charged with time not actually spent on his car. The overhead takes care of the time between jobs, and furthermore, the mechanic knows that there is no blame attached to waiting when he has not been given anything to do. He knows just what to do when he has finished a job and I know just where to find him.

"The idle time charged to overhead amounts to from $200 to $500 a month, but this is negligible in comparison with our large volume of business and it pays many times in satisfaction and its beneficial effect on getting the work out."

In regard to material, this is entered on the charge-blank, when it is made out, and any additional material needed by the mechanic is entered on the material-record, which is a part of the charge-blank. A neat system for avoiding lost time in waiting for material is used. Each mechanic has a number, and there is a board across one end of the room as shown in the illustration with numbers on it large enough to be seen from the opposite end of the room. There is an electric light at each number. When the material ordered comes to the tool-room from the store-room, the tool-room man lights the light of the mechanic that ordered the material, and blows a whistle. By looking at the board the mechanic can tell when his material is ready for him.

Time Order Taken

Car Received

Job Finished

Customer Notified

Car Taken Unfinished

Car Returned

DON LEE—CHARGE BLANK—LABOR RECORD ONLY

If there is not enough room on this Charge Blank to record all the labor, another Charge Blank must be used and the Material Record sent to the Stock Room.

Charge Blanks MUST NEVER be destroyed. If cancelled they must be sent to the office.

This Charge is Continued on No. ..... This Charge is Continuation of No. .....

Date of Work Month	Day	NAME OF WORKMAN	Operation No.	DESCRIPTION OF WORK DONE Do not write over side line. Use another line if you need it	TIME ON JOB Hours	Min.	MARK OR ACCT. No.	HOUSE CHARGE Hours	Min.	Rate	Amount	CHARGE CUSTOMER Hours	Min.	Rate	Amount

This labor record is on the back of the charge blank. The workman enters his time when he has finished the job. The time entered here must agree with his time-clock card. The cost to the shop of the labor is entered in the column 'House Charge'; the overhead is added in the column 'Charge Customer'. The total from this sheet is entered as a sub-total on the 'charge blank'.

Generated on 2024-09-30 01:51 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

"How can you tell about when you can get a job out with fifty mechanics to supervise?" Mr. Beaudet was asked. "I segregate roughly the tags for the floor-work on rows of hooks into the classes of work. The tags for electrical work, upholstering, sheet-metal work, etc., are put immediately upon the hooks of the respective departments. In this way I can tell at a glance the amount of work that is ahead. I also have a board with fifty rows of eight holes. The rows are numbered from one to fifty, representing the numbers of the mechanics. Each row has eight holes representing hours. When I give a man a job at 8 a.m. that I know will take about two hours, I put his peg in the hole representing 10 a.m., then I know he will be available about that time. Then by looking at the board I can tell just when any of my men will be available for another job."

"No repairs are made to a car that are not authorized on the charge-slip. A 'notice to owners tag' is used to advise the owner of any repairs that are necessary. In case some of the repairs listed cannot be made for any reason, such as not having the repair part in stock, the owner is notified to that effect on this tag. Then if he comes for his car after hours, he sees from the tag, which is attached to the steering-wheel just what has been done or has not been done to the car; hence he is under no misapprehension. This has saved a great deal of misunderstanding.

"You say that you give work only to the men that are fitted to do it. How do you train new mechanics?" was asked of Mr. Beaudet. "We are really operating a training school all the time, but the training school is charged to overhead," he replied. "The customer does not pay for it. I employ bright men, start them at 50 cents an hour, and have some mechanic show them how to do some simple repair-job and charge his instruction to overhead. Then I keep them on the class of work that they are capable of doing and from time to time instruct them in other jobs in the same manner. As they become more useful and proficient, their wages are advanced. We have tried hard to overcome the prejudice that automobile owners have against repair shops. The owners have an idea that boys and inefficient mechanics do the work on their cars. That is not the case in this shop. I do not permit a man to do any repair work that he is not perfectly competent to do. The men are instructed to call for help whenever they find a condition with which they are unfamiliar, or run into work that they are not perfectly capable of doing. This method not only minimizes the chance of sending out a botched job but also prevents the use of too much time on the job. We have a scheduled maximum time for every repair job. If it takes longer, the customer is not charged for the excess time, but if the job is done in less than the maximum time the customer gets the benefit of it. This prevents the customer being charged for the education of new men, or for lost time for any reason."

Another interesting feature is the four o'clock checking hour. At four o'clock a whistle blows and every mechanic whose job is promised for five o'clock checks up his work, and if he is not able to complete it by that time calls for help, and enough men are put on the job to finish it on time.

Apparently, the system is simplicity itself. The men are handed their instructions, go to the time-bench and ring in and find from the charge-blank where their car is, go to work and finish the job, and come back to the idle-time bench for another job. Everyone seems to know just what to do without having to run to the boss. The master mechanic is able to go about the shop and supervise without having the distraction of a hundred and one details. The idle-time system and the method of training mechanics are two features that are worth the serious consideration of shop-men. The former really goes a long way toward eliminating idle time and non-productive work. The latter takes the place of the apprentice system, which is unsatisfactory and a failure in many instances. The method of beginning men at a fair wage and instructing them on company-time costs very little, as they are really trained as specialists on different operations, being advanced from time to time to more difficult jobs as they become more proficient. The system benefits the shop by furnishing a satisfactory supply of mechanics, and it benefits the men by giving them a training without the disadvantage of the low pay of the apprentice system. Both sides seem to be satisfied.

Lists of Importers and Other Business Houses in Mexico and South America

The Bureau of Foreign and Domestic Commerce has compiled the following lists, which may be obtained from any of its district offices by referring to the file numbers:

	File No.
Importers of hardware in Punta Arenas, Chile	9647
Importers of iron and steel products, Mexico	9848
Importers of hardware in Peru	9849
Agents and jobbers in Peru	9850
Architects and builders in Peru	9851
Importers of agricultural machinery in Peru	9852
Railways in Peru	9853
Foundries in Peru	9854
Mining companies in Peru	9855

A COLORED CHAPLAIN was addressing a squad of colored men back of Bar-le-Duc.

"Boys," he said, "Satan is powerful, but he is not omnipotent. He is bound with chains, yet he can get at you"—and the chaplain pointed to a Mobile soldier—"and he can get at you"—and he pointed at a soldier from Washington—"and he can get at you"—and he pointed to a soldier from Paint Rock.

The Paint Rock soldier gave a grunt.

"Why, boss," he protested. "The old cuss might as well be loose."—Washington Star.

Generated on 2024-09-30 01:54 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Manufacture of Tractor Parts by the Johnson Gear Company

By O. E. BACH

THROUGH the courtesy of the Johnson Gear Co., we are able to present this description of one of the interesting pieces of work done at their plant. Mr. O. E. Bach is superintendent for the company. The photographs illustrating the article were taken by Mr. A. J. Bach, foreman for the company.

THE accompanying illustrations show in detail the manufacturing process for bevel-gears with a three-jaw clutch integral as used on a tractor manufactured in the Bay district. The bevel gear, herein shown, has 42 teeth, 5/7 pitch, 20° pressure angle, lengthened addendum, and a mating-pinion of 13 teeth.

The forgings are made of open-hearth steel, No. 1020, Society of Automobile Engineers' analysis, and are hammered in a die to a form of the general outline of the gear, after which they are annealed properly and tumbled in a rattling-barrel to remove all scale, preparatory to machining.

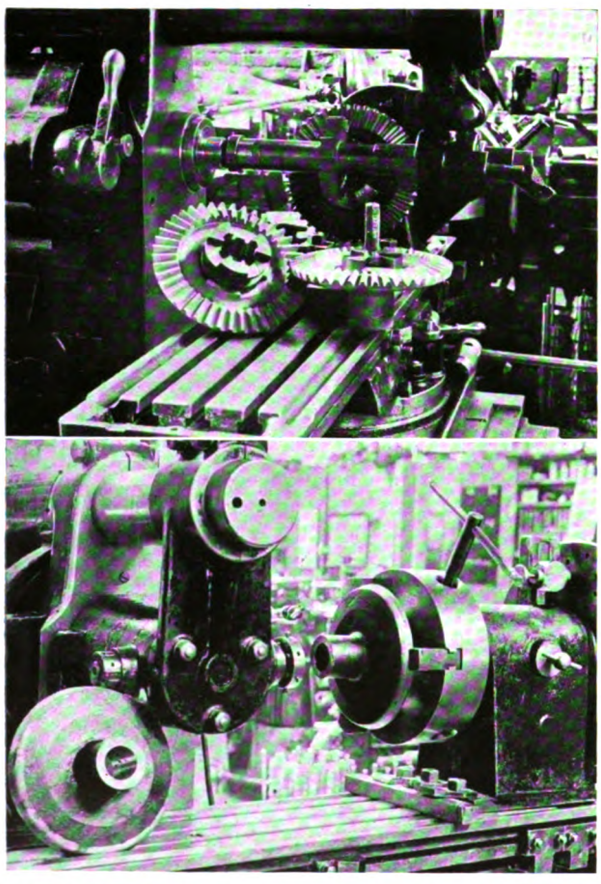


FIG. 4 AND 5. ILLUSTRATING OPERATIONS IN MILLING THREE-JAW CLUTCH AND MILLING OIL-GROOVE ON BACK HUB

The first operation, shown in Fig. 1, consists of gripping the forging by the back, turning the outside diameter, the face, and edge angle by the use of flat-formed tools, rough-drilling the hole, and forming and counter-forming the jaw-clutch. All this is done in consecutive operations on 3 ft. by 36 in. Acme turret-lathes having an auxiliary cross-carriage for the forming tools.

The second operation consists of gripping the blank on the outside diameter in three-jaw universal chucks, facing the back of the hub and final-reaming the bore, leaving 0.02 in. for grinding after heat treatment.

The blanks are then inspected, according to the limits specified in the blueprints. The blanks are inspected both as to sizes and for flaws caused by material defects or forging.

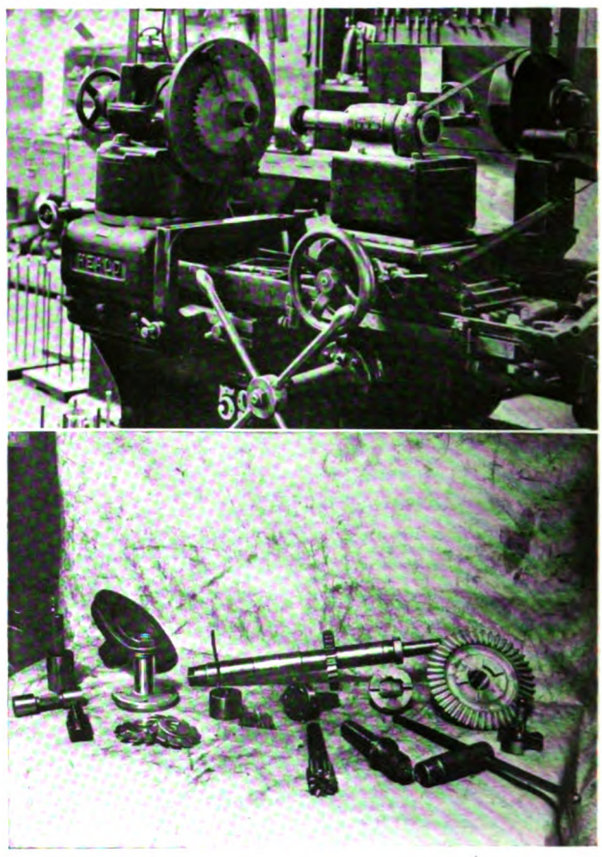


FIG. 6 AND 7. GRINDING AFTER HEAT TREATMENT AND COLLECTION OF JIGS AND TOOLS

Fig. 2 shows the operation of roughing out the teeth as done on 'Gould & Eberhardt' multiple-spindle gear-

Generated on 2024-09-30 01:56 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

cutter. As this tool only gashes the teeth, the blanks go next to the 'Gleason' two-tool type generator, for the final shaping of the teeth, as shown in Fig. 3. This machine produces a gear true to curve and gives a perfect

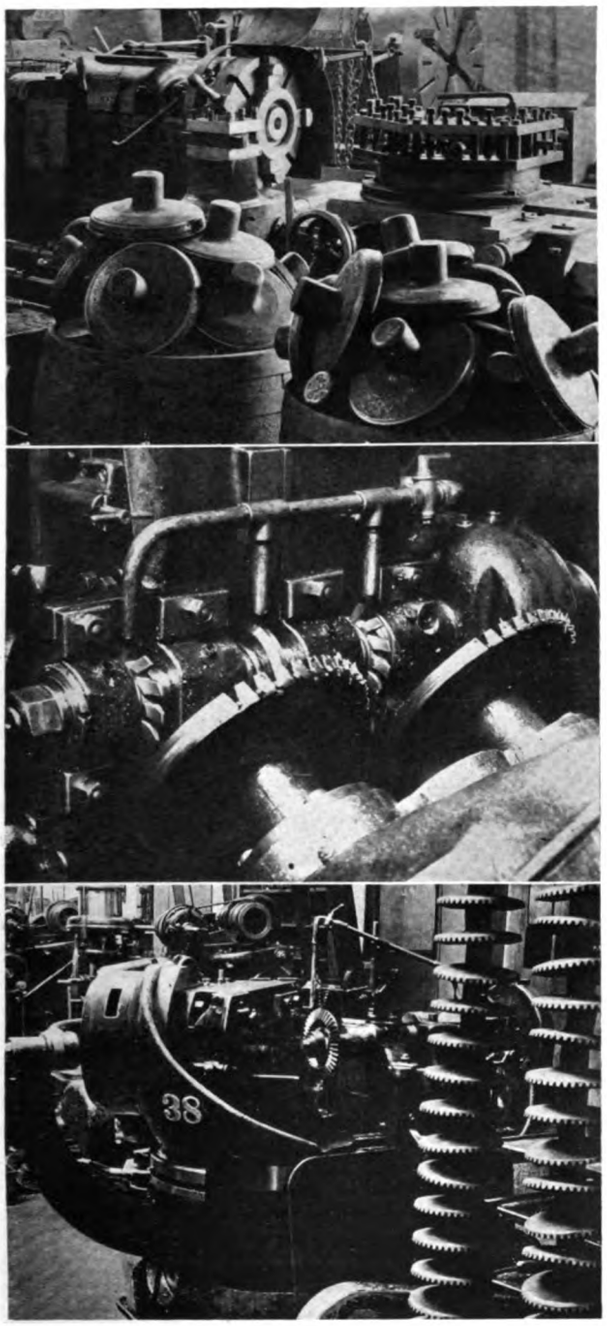


FIG. 1, 2, AND 3. TURNING BLANK ON TURRET-LATHE, GASHING TEETH ON GEAR-CUTTER, AND SHAPING TEETH ON GLEASON GENERATOR

contact with its mating-gear, the entire length of each tooth.

As this particular gear performs a forward and reversing function when assembled in the tractor, it runs idle on a shaft and is driven through a three-jaw clutch integral to a mating clutch on a splined-shaft. The operation and fixture used for milling the three-jaw clutch is shown in Fig. 4. This also shows the mating-clutch and the test-plug used by the inspector. The clutches are relieved on the jaws to make an easy entry and are also cut with a 2° back-rake to prevent pulling out of mesh under a running load.

To take care of lubricating the thrust on the bevel-gear, an oil-groove is milled semi-circular on the back hub. This is done with a special cutter-head with inserted cutters mounted on a universal milling-head. The cutter-head and method of holding the blank are shown in Fig. 5.

The gears are again sent to the inspector for final approval before being heat treated, care being taken that all gears are properly stamped for future identification and that all burrs caused by machining are removed.

The material used is 0.15 to 0.25% carbon-steel and therefore requires a carburizing treatment. The gears are packed in metal boxes containing a ground-bone mixture, cover-sealed with fire-clay, brought gradually to 1575–1600°F. in oil-fired muffle-furnaces, and baked for eight hours, then allowed to cool. They are removed from the pots and re-heated to 1450°F. and quenched, after which they are drawn in oil to 425°F. This process hardens the entire surface to a depth of $\frac{1}{32}$ in., gives an elastic core, and shows a scleroscope hardness of about 80. The gears are next sent to be sand-blasted. This process removes all scale and oil from heat treating, leaving a clear bright surface.

As slight distortion cannot always be prevented, it is necessary that the bore be ground to gauge; extra stock having been left for this operation, as mentioned in the early part of this description. The back of the hub is also ground, this acting as a thrust-washer. This is shown in Fig. 6.

On account of the close limits observed, the gears are again sent to the inspection department for final inspection before shipping. A number of the jigs and tools are shown in Fig. 7. This special equipment ensures interchangeability of parts produced; also facilitates the rapid manufacture of the article involved.

NURSERY RHYME

Never use a scoop; always use yer hand.
Don't turn off the faucet; just forget it, and
When it comes to flour and other stuff you know,
Always carry in a sieve and make the profits grow.

Generated on 2024-09-30 01:50 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Special Fixtures for Facilitating Automobile Repairs

In the repair of automobiles there is a great deal of repetitive work. The same job, for instance certain adjustments to the clutch or brake, comes in time after time. Special fixtures and gauges can be devised that will make the adjustment and repairs much easier. These tools not only save time on a job but also ensure greater accuracy, both of which advantages are much to be desired by the car-owner.

Through the courtesy of Joseph Sexton, manager of the repair department of the Peacock Motor Sales Co., 'Metal Trades' is privileged to reproduce some of the special fixtures used in the repair work. Although these devices were designed especially for use on the Chandler car, with little change they could be adapted to the work in any automobile-repair shop.

At the upper left is a rig for holding connecting-rod and cap while the babbitt bearing is being pressed into place before scraping. If these babbitt bearings are not pressed in, they loosen much quicker because of settling into uneven places in the rods.

The upper right-hand illustrates forcing the wrist-pin through the bearing to mark the high spots for scraping. The plate resting on the bed of the press has openings to fit the various size bearings. Adjoining it is a tool for reaming the connecting-rod bearings to size. This eliminates the roughing-in scraping.

One of the causes of a drag in the clutch is uneven tension in the springs which causes the bushing of the throw-out collar to pinch on the shaft. In the device at the middle left, tension is put on the spring through a ball about an inch in diameter resting on the cap. If the spring becomes lop-sided under tension, like the one shown, it is discarded.

At the middle right is a rig for holding the spring-tension on a Borg & Beck clutch while it is being taken down. The channel rests on the base of the press and the U-piece is used under the plunger. A gauge for lining the two arms of the throw-out yoke of a clutch is also shown in the picture. With this device the arms are brought in correct position in relation to the face of the housing. If these arms are not in alignment, the throw-out is brought unevenly against the clutch-brake, giving the same effect as a dragging clutch. The throw-out bushing is pinched on the clutch-shaft if the two arms are not in line. This also gives the effect of a dragging-clutch.

The stand for testing and adjusting differentials is directly below. The motor is reversible and of variable speed. This test shows how the gears work under load and whether or not there is a back-lash.

At the bottom are two handy horses of angle-iron; one slips under the frame of the car, releasing the jacks, the other is for holding the differential housing as shown.

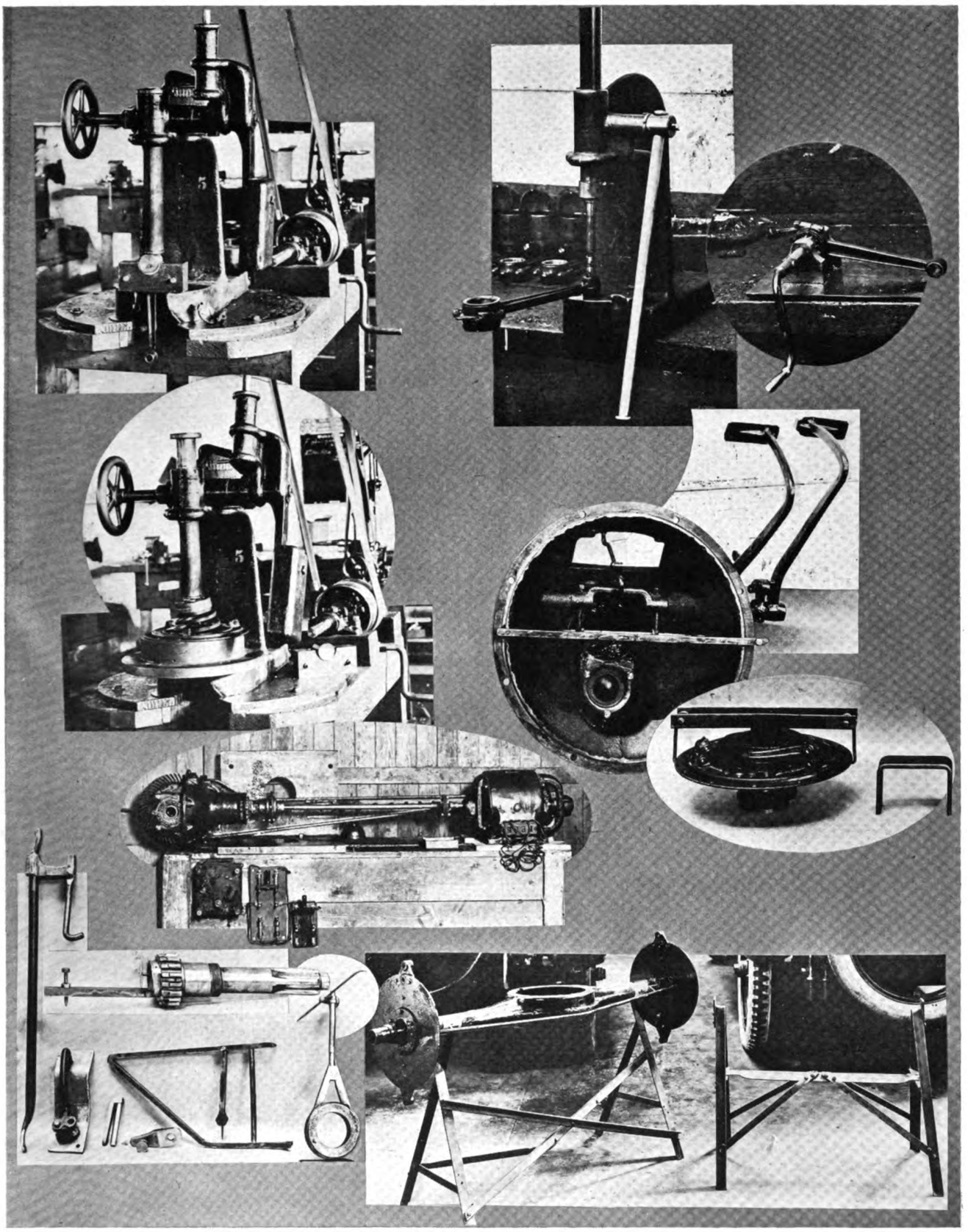
At the lower left are some jigs and gauges used in repair work. No. 1 is a pinch-bar used to test for side-play in springs. The first hook is to test the rear-end of the rear-springs and the front-end of the front-springs. The heel of the first hook is used against the frame on the front-end of the rear-spring to find play in one direction. The long hook fastens over the frame to find the play in the opposite direction. The other end of the bar is a handy pinch-bar to take up the up-and-down play in the shackle-bushings. No. 2 is a gauge for adjusting the clutch bell-crank. It is necessary that the angle made by the arm and a line drawn through the two holes should be the same in all the cranks. By fitting the holes over the two pins, the point at which the end of the arm comes determines the angle. As the arm is made of malleable iron, it is easy to twist into the proper position. No. 3 is a gauge for testing the size of the clutch bell-crank shoes. The gauge is built on an angle and the shoe is slipped on the pins. The distance it goes down determines the size. These shoes must also be exactly the same to give the best results. No. 4 is a pointer that is fastened to the fly-wheel to determine whether or not the crank-case is in line with the engine-shaft. No. 5 is a handy plumb-gauge to test the alignment of the king-pins in the front-axle. This is used as a quick test on the floor to see if erratic steering is caused by the king-pins not being in alignment. No. 6 is an indicator to centralize the brake-shoes. It slips over the axle-tubing in place of the wheel-bearing. As it is revolved, the surface-gauge shows the alignment of the brake-shoes. No. 7 is a gauge to test the alignment of the transmission. The gauge is inserted in the end of the clutch-shaft and locked by the set-screw, the sliding gear-shaft first being removed from the transmission. The set-screw in the end is adjusted into the bearing-cage of the sliding gear-shaft. By turning the motor the mechanic can see whether or not the bearing is in alignment with the clutch-shaft.

It was at the Greek Theatre. 'Miriam, Sister of Moses,' alias Ruth St. Denis, was dancing the Israelites from the Red Sea to the wilderness. At left centre of the stage stood two policemen listening. The actors were discussing the merits and demerits of one god, Baal, who appeared to have a big influence on the play.

"What are they doing now?" asked one cop of the other.

"Well," replied the second, "it's kinda mixed up, but the way I make it, the guy on the end with whiskers is trying to get bail for Moses."—Los Angeles Times.

Generated on 2024-09-30 01:52 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN



SPECIAL FIXTURES FOR AUTOMOBILE REPAIRS. FOR DESCRIPTION SEE TEXT ON OPPOSITE PAGE

Generated on 2024-09-30 01:49 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

The Machinery Merchant as a Banker

By An Occasional Contributor

THE author of this article, who prefers to remain anonymous, is in a position to know whereof he speaks. We will be glad to have other sides of this question presented.

THE present unequaled demand for equipment for the small machine and repair shop has developed a condition that is not a healthy one for either the machinery merchant, his customer, or the locality for which shop equipment is purchased.

The early days of the automobile business are an example of a condition that exists today. Did the local bank finance the automobile dealer? He did not, and only recently have the best established concerns been able to call on their bankers for the assistance that is due a local going concern when money is needed. There was abundant reason why the banker could not back any and all automobile dealers, as the chattels on which the loans would have had to be made are easily removed from the reach of the local institution.

Today we find the automobile business firmly established in all parts of the country and the firms rated in all financial agencies. The majority of dealers owe their present high standing to selling ability and able management. Few, if any, of them have made their success because of mechanical ability or shop equipment. In fact, those that are known for ability to repair machines have gained this reputation because they were forced to give service as a backing to their selling organization.

Concerns in the automobile business can be divided into three principal branches: The agency, or the selling organization, the garage and supply station combined (without an agency for an automobile), and the garage with machinery to repair automobiles or do any kind of machine work. The two last mentioned are the concerns that most interest the machinery merchant. These are the branches of the automobile business that are established with investments in the local community. They do not depend upon the sale of new machines for their existence, and consequently are not subject to the ups and downs or whims of the public pocketbook, in fact the less spent for new cars, the greater will be the bills for repairs of old equipment.

In a garage where all the repair work is done with hand-tools, the mechanic is limited to adjustments and the replacing of worn or broken parts. Many times a small amount of machine work will mean a big saving to the owner of a machine in both time and money. A greater profit would also accrue to the man making repairs were he able to do this machine work. In a garage limited to hand-tools, the profit must naturally be found in the sale of gasoline, oil, and accessories, as well as washing and storage. If the service rendered in a garage as described above is satisfactory, the owner soon has a highly profitable and substantial business, one that is a credit to the locality in which he lives.

In the garage just described there will be employed at the most one skilled man, the rest of the labor required being to look after storage and washing of cars. Some one in the office is also needed, in fact the organization is almost a 'one-man affair' and remains so until machinery is installed.

The garage with machinery to repair automobiles is today one of the largest and best business activities to be found in rural communities. When equipment necessary for repairing automobiles has been obtained, the mechanic has some tools that will aid him in securing repair work on motor trucks also, and the same equipment will in a measure assist him in repairing tractors. It will not be long before the garage with machinery will blossom out under its real name, that is general machine-shop for repairing tractors, trucks, and automobiles, and for all kinds of machine work.

The machine-shop in the country town now replaces the village blacksmith and is more essential to the upkeep of the town and the surrounding country than ever the blacksmith thought of being. One horse out of commission for lack of shoes meant only one horse-power tied up, but one cylinder on a tractor out of commission in plowing time means a real delay unless the right man is at hand to repair it.

Many of the small shops in the back of a garage or in a shed of some kind are in the hands of skilled mechanics, who are thoroughly trained in their profession, and who have secured machine work because of the reputation they have made by doing first-class jobs for their patrons. Another valuable asset such a mechanic has is his independence and determination to have a business for himself. This man's capital up to a certain point has consisted only of his brain, his determination, his hands, and a few dollars worth of hand-tools. He is worth to the community the amount he makes out of this equipment. This is possibly a little better than skilled mechanics' wages.

By hard work and saving this man accumulates enough money to buy equipment to start a small machine-shop. How does he buy it? Let us say that the equipment he needs will cost $1500 and that he has $500, a good reputation locally, good credit at the machinery house, where he has always paid his bills when due or discounted them, and in his shop $500 worth of used hand-tools and other supplies. A man in any other business would go to his banker. Not so the machinist.

Generated on 2024-09-30 01:53 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

He goes where he knows he can get results, namely, to the machinery merchant. But, when he goes to the machinery merchant he has only one item of his assets that can be considered at all, namely, the amount of cash he has in hand with which to make the first payment amounting to a definite proportion of the total cost of the equipment to be purchased, the balance to be paid in monthly payments with interest on the deferred payments.

The facts that this man has an established business, some assets, a good reputation, and is an able mechanic can have no weight with the machinery merchant except that his is a desirable account. The conditions under which he would buy on terms would not change, no matter who he was nor what was his standing. In other words, a hand from the dark puts a certain amount of money on the table and the machinery merchant tells the hand what he will do, as follows: "This is your first payment amounting to a definite proportion of your purchase, the balance must be paid in monthly payments with interest on the deferred payments, title to the machinery to remain with us until payments are completed."

Supposing the mechanic is able on these terms to install a lathe, drill-press, forge, welding outfit, grinding-stand, motor, and the tools that go with such an outfit. He then has a shop that one man cannot handle with advantage. He knew this before making his purchase, and as soon as the equipment is installed he must hire at least one skilled mechanic to assist him in the shop. This means an expense of at least $6.40 per day. To keep this skilled man busy a helper will be needed to take down and assemble the work for the machinist, requiring another $4.80. Including a boy and the proprietor himself, the man that was spending only a little more than wages in the town now has a payroll of $25 per day counting himself as worth $10.

Even assuming that the shop this mechanic starts does not do the machine work on automobiles, trucks, and tractors any cheaper than if the work were sent to the neighboring town, is it not worth something that a day's work is saved for the truck or tractor or that the request of the banker's wife for a new machine is forestalled because the old car was ready a day sooner than was expected? Shouldn't a man capable of understanding such a business receive some consideration from his banker? It would seem that the banker, since he is acquainted with local conditions, could relieve the mechanic of the heavy monthly payments, could extend the time if necessary, and could assist him in other ways, such as discounting his bills, and accepting his accounts receivable. It does not seem right that the machinery merchant should finance the shop in the small town, as he has a fight on his hands all the time to keep from financing the manufacturer of the goods he is selling.

If the shop established by our mechanic does first-class work with its small equipment and takes proper care of the customers, it is only natural that the business should increase. Furthermore, since the first equipment was purchased primarily for repairing automobiles, to make sure of getting and keeping the truck and tractor work the proprietor will need more and larger equipment. Whereas the first installation cost approximately $1500, the second will require nearer $5000, and again we find him in the field for machinery. This time he comes into the market with the following assets:

Original hand-tools	$ 500
Additional hand-tools	500
Machinery purchased	1,500
Supplies, steel, bolts, nuts, etc.	300
	$2,800
Good will, ability, reputation, benefit to the community, money saved for customers, assistance in emergencies	$0

Let us assume that confronted again with the need of purchasing equipment, he finds himself with $2000 cash in addition to the above assets, where will he go this time to finance his purchase? He will go again to the machinery dealer, and he will be told again that the terms that he had on the first purchase are still in effect, and only on that baiss can he purchase machinery on terms. Does the fact that he has paid his bills promptly or that he is well established, or any of the other considerations that should make credit good, help him? Only if he is willing to take the machinery at 30 days net. If he wants terms, he must take those he already knows so well.

When this $5000 worth of equipment has been installed our mechanic will be carrying a payroll of at least $200 per week and he will be buying nearly that amount per week in supplies needed for the shop. Including rent, taxes, insurance, and other items he is conducting a business that means thousands of dollars a year to the community in which he is situated. When this $5000 worth of equipment is in place he is equipped to handle all kinds of tractor, truck, and automobile repairing, but tools will still be needed to complete the shop and hold all the work pertaining to this kind of repair work. To purchase a crank-shaft grinder, piston-manufacturing equipment and grinder, milling-machines, and cylinder-grinder will require about $10,000. The country shop is built up in this manner, little by little, and, as a rule, tools are not bought for cash, since, where the shop is in the hands of able mechanics, they will usually try, as far as possible, to make the new equipment pay for itself on the terms under which they are buying.

The foregoing describes the usual manner in which our country machine-shops have been and are being built up. Today the country shops already have much more work than they can do, and they are handicapped for lack of equipment. This is particularly so in the districts where tractors have replaced horse-drawn equipment. Few people realize that within the last three years millions of dollars worth of mechanical equipment has been installed on the farms of this State, and that the amount of machinery available for repairing all this equpment has not kept pace with the new installations. There is nothing so dead as an engine that will not run, a tractor that will not pull, a truck that will not move its load. No amount of grooming will help these machines. Mechanics

Generated on 2024-09-30 01:51 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

are needed, and machine-shops must be available in which these mechanics can do their work.

To overhaul a large tractor completely is an expensive proposition, not expensive in cost per acre plowed, but expensive in actual outlay of labor, machine work, and parts.

Approximate cost of complete overhauling of 75-hp. tractor	$2,000
Freight, loading, and unloading	250
Outlay by owner if machine is shipped to a city with a large shop	$2,250

Analyzing the above, we find the following:

Repair parts	$1,000
Labor	1,000
Freight, etc.	250
	$2,250

If the job cited above could have been done in the local shop, it would mean that the greater part of the outlay could be saved to the community and possibly a quicker job done than if the machine were sent away. The loss to the community can be summed up as follows:

Cost of labor	$1,000
Profit on new repair parts	200
Freight as above	250
Reclaimed parts and scrap	100
Loss to community	$1,550

These losses apply not only to tractors, but also to trucks, automobiles, pumps, motors, farm equipment, and any work a mechanic can do when he has tools at hand.

Have the bankers and merchants of rural California given due consideration to the change from animal to engine power? It does not seem so. A serious set-back to the farming country can be averted only by making better provision to handle the mechanical repairs that will be necessary to the power equipment now on the farms.

In selling machinery, the salesman that sells to a man merely what he asks for, is doomed to failure. The salesman must be able to perceive and to bring to the attention of the shop-owner, the lack of equipment needed to produce the best results in the best way at the least unit cost. The shop-owner appreciates this interest on the part of the machinery salesman, and feels that a good live salesman by calling on him is assisting him to keep in touch with everything that is new and up-to-date and is trying to keep him equipped with all that is necessary to meet competition.

Is there nothing to banking but the provision of a safe place of deposit for our money? How is the mechanic who has always worked for wages to know about discounting his bills, how is he to know what his credit is worth? How is he to find out that his accounts receivable if good can be turned into cash at the bank? If the machinery merchant had such service to sell at the profit the banker could make out of such service, he would certainly have a salesman on the job.

Frequently when the machinery merchant finds a shop ably conducted from a mechanical standpoint but slow in meeting its obligations, he discovers conditions that, in a way are due to poor banking salesmanship. The credit-man finds country shops carrying open accounts of farmers, freighters, merchants, and manufacturers on his books, which are from one to six months overdue. These are good accounts and no doubt could be handled through acceptances. This is one place where the banker should step in and start the dead capital to moving, but he does not do it. The machine-shop owner goes merrily on his way and only wakes up when the machinery merchant, after many appeals for money, sends him his order for $10 worth of goods C. O. D., as his account is 60 to 90 days overdue.

A credit man of one of the machinery houses in San Francisco could tell a story that would be a revelation to many bankers. There are many shops whose success today is due to the able advice given by some of the credit men. Their insistance on the payment of accounts when due has started many a hard-working man on the right road to financial success.

Employment Managers Hear Officers of Retail Research Association

Speaking at a meeting of the Service and Employment Managers' Association of California, Alvin Dodd, president of the Retail Research Association, described the work of this Association and of the possible application of some of its methods to the problems of Pacific Coast industrial plants. The Association was formed about two years ago as a result of a meeting held in New York of department-store owners and managers at the suggestion of Edward A. Filene, of Boston. Convinced that the efficiency expert, who walks into a store or plant, installs a system, and walks out again, falls short of really solving the problem, these owners formed a co-operative association for the mutual study of their common problems, believing the combined knowledge and experience of the entire group to be greater than that possessed by any outside expert. The Association comprises about 19 stores in various parts of the country, with a total volume of sales, including European branches of $200,000,000 per year. Membership in the Association is limited to a total of 25; only one store from a given community or district can be admitted; admission is on unanimous vote of the members; and the candidate's chances of admission are dependent upon his possession of ideas and ideals, ability to do team-work, and willingness to give of his experience, rather than the qualifications more often required for membership in a commercial organization.

The results already achieved by the Association include the establishment of a central buying office in New York, the exchange of complete financial records between auditors of the various stores, co-operative study of policy between the advertising managers, and similar co-

Generated on 2024-09-30 01:48 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

operative investigations of employment conditions. This last activity has come somewhat as an afterthought, as the result of the demand for this kind of investigation from the staffs of the general stores themselves. Distributing agencies in general have had relatively little labor trouble during the past few years, as compared with manufacturers, and the members of this association are attempting by a study of employment problems to forestall possible trouble in the future. One feature of this investigation is the study of every job in the store, determining: First, what does the worker have to do in this particular job? Second, what does he have to know? Third, what does he have to be? In this way, a summary of the qualities, physical, mental, and moral, required for every job can be obtained.

Philip J. Reilly, of the Retail Research Association, and president of the National Association of Employment Managers, was then introduced. He mentioned the work of the National Association, which serves as a representative of, and a clearing-house for, the local employment-managers' association, and then discussed the application of certain parts of the Retail Research Association's work among department-stores to the similar problems of the industrial plants. He recommended in particular the preparation for each plant of what he called a 'labor audit', covering such matters as sources of labor-supply, methods of recruiting, of payment, and of promotion.

Another important measure is the study of every job and the preparation of 'job-specifications' covering the points mentioned already by Mr. Dodd. These job-specifications serve as a basis for standardization of employment, and even for a voluntary increase of pay when the employee's record and the job-specification show such an increase of pay to be justified. The establishment of company unions and other employees' organizations that may ultimately take part in management is also desirable.

Mr. Reilly referred to the friction that occasionally develops between the foremen and the employment department because of the latter's taking over the old prerogative of the foreman of 'hiring and firing'. This friction is sometimes caused by an excess of zeal on the part of the employment staff. The employment department will do well to go slow and establish cordial relations with the foremen, even at the risk of some delays in its program. Some Eastern companies even put a foreman into the employment department for a short period so that he can realize the cost of labor turnover and the importance of industrial training, and even to bring him to such a realization of the needs of the entire plant that he will not object to the transfer of a good man from his own department to one where the man can serve both himself and the company to better advantage. In general, before proposing any measure, an employment manager should ask, 'Will it raise or lower the self-respect of the man affected?' The foreman should not get the impression that the company considers him 'a poor fish' and that because he has failed in that part of his work relating to 'hiring and firing', it is being taken away from him and given to the employment department.

Ira B. Cross spoke of the difficulty experienced in most of the industries of the Bay district in enlisting the co-operation of the workers with the employment department and of the opposition frequently encountered from labor leaders and other union men. In the discussion that followed, J. F. Johnston, of the Union Construction Co., without attempting to discuss the advisability or inadvisability of the closed shop, called attention to how much closed-shop conditions influence much of the work of an employment department. The technique of employment management has been developed in the main under open-shop conditions, and he made a plea that the National Association of Employment Managers devote attention to the study of how this technique may be adapted to closed-shop conditions.

About forty members and guests attended the meeting. The officers of the California association for the coming year are president: C. L. Foster, Union Construction Co.; vice-president, M. C. Burr, Shell Oil Co.; secretary, C. M. Goss, California-Hawaiian Sugar Co.; treasurer, P. J. Hayselden, San Francisco Shipbuilding Co.; advisor, Ira B. Cross, University of California.

SENATOR MARCUS SMITH of Tucson was entertaining some friends in the Killard grill with stories about the Arizona desert when a bore joined the party.

This bore was the kind of a chap that always laughs in the wrong place and spoils a story by trying to guess its climax. The Senator undertook to silence him.

"Poor Ferguson!" he said. "That was a close shave he had in the desert last August."

"Sunstroke, of course," said the bore.

"No, not exactly," said the Senator. "You see, Ferguson stumbled accidentally on the Cauldron—our famous spring, you know, that gushes out of the rock at freezing-point and immediately begins to boil from the fierce heat of the sun."

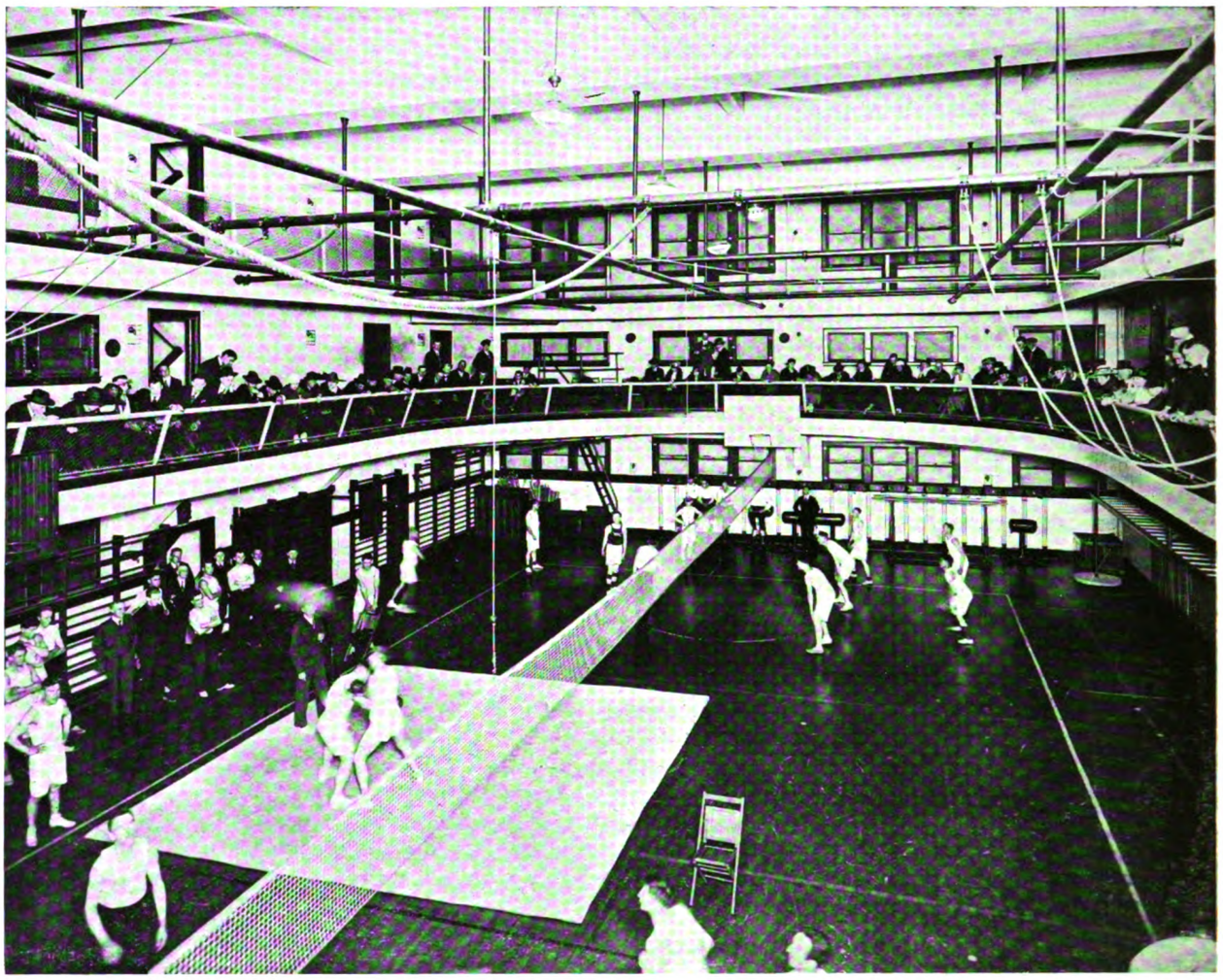
"Of course, of course," said the bore. "And what happened to Ferguson? Did he fall in the Cauldron and boil to death? Get on with your story, man."

"Ferguson fell in," said the Senator, "but he managed to scramble out again. The peril, however, was not yet over for him. Our Arizona air, you see, is so dry that it absorbs moisture with astonishing rapidity. Well, the boiling water in Ferguson's clothes evaporated so fast that the poor fellow instantly froze stiff."

"I see," said the bore. He died of cold. Well, that reminds me—"

"No, he didn't die," said Senator Smith. "He almost died, but he had a miraculous escape. In his stiff-frozen state, you understand, he began to shiver with chill, and he shivered so hard that in a few moments he became overheated and would have succumbed to sunstroke if he hadn't providentially broken into a cold sweat."—Los Angeles Times.

Generated on 2024-09-30 01:50 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN



GYMNASIUM-FLOOR AT ASSOCIATION BUILDING ON AN AMERICAN CAN CO. NIGHT. TWO GAMES OF VOLLEY-BALL AND A BOXING MATCH ALL UNDER WAY AT THE SAME TIME

"Sending Them to Work With a Smile"

The noon whistle sounds in the factory.

The whirr of machinery stops. There is the shuffle of hurrying feet.

Through the doors file long lines of grimy, tired men. The sweat of honest toil is on their brows. They are tired in mind and body.

But they are in a hurry. They press into the factory yard, open lunch-boxes and devour food as if the lunch period was ten minutes instead of forty.

A few minutes and the reason for their haste is apparent. Some hurry to the volley-ball court; others to the baseball field; some of the older men take the quoits.

Those who are not playing are watching, rooting for one side or another. Play is in the air, it is the order of the hour.

When another whistle calls these workers back to their labor they return as fast and as eager as they left; return with a smile on their faces instead of a chip on the shoulder.

This, in a word, is what the San Francisco Young Men's Christian Association has done for the workers in industry. This is what already has been accomplished in nine industrial plants of the metal trades industry in San Francisco and South San Francisco. It has been done through the efforts of J. H. LeGrand, executive secretary of the Industrial Department of the local Association and a corps of able and conscientious assistants.

This movement has not been confined to the metal trades alone, but is being carried on in all lines of industry. Plants of various kinds have adopted the program, and others are ready to take it up. Eight more plants of the metal trades have asked to be included. The Y. M. C. A. knows no distinctions. Its service is open to all who wish to avail themselves of it. Besides

Generated on 2024-09-30 01:53 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

the athletic and recreational features of the industrial program, educational classes are being conducted and Americanization work is being given for the men and women in industry who are newcomers to America. The purpose behind it all is to help the worker and to help him to help himself.

With employers and employees in the metal industries playing games together, finding recreation side by side (and the employer often needs it more), there is being created a spirit of co-operation that can work only to mutual advantage. That spirit is sending working men and women to their posts with smiles on their faces. It is keeping them strong of body and clear of mind. It is taking the drudgery out of work and creating a spirit of good feeling toward themselves and toward their employers. Surely no one is the loser for that.

Of course, all of the workers cannot indulge in the sports at the same time, but that does not matter. The play spirit, that feeling that dispels the drudgery and fatigue of hard labor, is catching. It is in the air. It is shared as well by those who watch, and those who play. That is manifested in a thousand ways.

The games in each plant are directed by a committee of five workers, suggested by the superintendents. O. C. Thompson, a member of the industrial department of the Y. M. C. A., is in full charge of the athletic phases of the program and gives these committees his assistance. In most cases the athletic equipment is furnished by the employers themselves. Where it is not, the Y. M. C. A. provides it. In addition to the noon-day sports, there are twilight games for the workers, played in vacant lots, city playgrounds, and other convenient places. Tournaments and other contests are frequent.

For example, a baseball league was organized recently among the employees of the American Can Co., with four plants at San Francisco, one at Oakland, and another at San Jose. The excitement of competition spread to every worker in every plant, and when one of the San Francisco teams went to San Jose to play the employees of the firm in that city, a lusty-lunged delegation of seventy-five rooters went along. The San Jose team saw to it that they too had plenty of rooters when they played on the local diamond.

Not long ago a superintendent in a plant at South San Francisco went to bat at an exciting moment in the game. One of his crew rushed up to him and slapped him on the back.

"Hey, I'll quit if you don't win this game for us," he shouted, and the crowd yelled its approval.

In another plant there had been friction between the foremen and the timekeepers. Various attempts at adjustment of the trouble were futile. Then Mr. LeGrand appeared on the scene with his Y. M. C. A. industrial program. It was not long before these once-quarreling foremen and timekeepers were playing volley-ball together. There has been no friction since.

Still the sports and games, as important as they are, make up but one phase of the industrial program; they form only one chapter of the story of what the Y. M. C. A. is doing for the men and women in the metal trades. Education receives its share of attention. Classes are held for immigrant workers to help them along Americanization lines, while other courses are given to aid men and women in industry to advance themselves in their work. In no case is there a charge for tuition. Most of the classes are taught by volunteer workers under the supervision of the educational department of the Y. M. C. A. In some cases the Association furnishes paid teachers for the more difficult work.

In one San Francisco plant a class in acetylene welding was started recently with 72 men in attendance. They are enthusiastic in the work, for it is opening the way for them to increased wages. The employers, in turn, are glad to have the efficiency of their men increased. In other places classes in commercial arithmetic, stenography, and kindred subjects are held for men and women.

The results are easy to see. One plant, for example, was recently enlarged considerably. An increased office force was needed. Instead of calling in outsiders, men and women who had become proficient in the subjects taught in the Y. M. C. A. classes were given the more important work. The workers were elated at the advancement and the employers were glad that they could offer the opportunity to members of the factory 'family'.

Notable results have been obtained from the Americanization work, which is under the direction of John R. Titsworth, one of the secretaries in the industrial department. Men and women of various nationalities are being instructed in English, civics, and other subjects. They are being helped in the subjects required for naturalization. In one case a woman sixty-five years of age, who had resided in this country for thirty-five years, was given her first instruction in English. She is the mother of eight children, all of them born in America. Yet it was not until she had studied in one of these classes that she was able to speak the tongue of the country in which she had lived for more than three decades. Besides its educational value, the Americanization work has a distinctly patriotic trend. It helps the foreign-born man and woman in industry to have a clearer and better conception of American ideals and institutions.

Singing, too, forms a part of the program which the Y. M. C. A. has introduced into the metal trades and other industries. There is a deep, potent, psychological value to the factory 'sing'. It brings men and women together in a friendly spirit. It is refreshing and conducive to cheerfulness and mental vigor.

As an indication of how this phase of the program is accepted and how it is growing, it is estimated that in the last six weeks, 30,000 men and women in the metal trades in and about San Francisco have taken part in factory 'sings' in the yards of their plants. These 'sings' are led by Robert E. Clark, singing director of the International Committee of the Y. M. C. A., the man who introduced company singing and marching songs in the Army during the War. A piano mounted on a truck is brought into the factory-yard. Song-sheets bearing the

Generated on 2024-09-30 01:51 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

ON LEFT, A 'SING' BY AMERICAN CAN CO. EMPLOYEES AT THE MAIN ASSOCIATION BUILDING. ON RIGHT, VAUDEVILLE ENTERTAINMENT DURING SAME EVENING

words of popular and patriotic airs are distributed among the workers. At a wave of the hand, a mighty chorus of workers breaks into song. And they are not satisfied with one song or two. The spirit is contagious. They like the idea and the 'sing' has become a popular form of amusement and entertainment. It is held now once a week in the plants that have adopted the program of the Association.

To further this work, Mr. Clark is conducting classes in the main Association building to train men and women to become song leaders, and, before long, metal trades workers will be directing the songs in their own plants. As with athletics, singing is a strong factor in creating the 'family' spirit among the army of workers in the plants. It, too, breaks down the artificial social barriers that may arise from time to time.

An instance is cited of a 'sing' in one factory-yard where a handful of office girls stood aside from the crowd of women workers and sang by themselves.

"Why don't you join the others?" asked the Y. M. C. A. secretary.

"But we're the girls of the office," remarked one of them, embarrassed.

"You're all working for the same company, aren't you?" retorted the secretary.

The office girls joined the others. Next day they did the same. Today they not only sing with the other women but eat lunch with them, join them in walking to and from work, and mingle with them away from the factory.

With the advent of fall, the managers of these plants and the employees came to realize that unless they made some provision to the contrary, winter would interrupt the program of the Y. M. C. A., and they were loath to hinder the good work that had been started. Accordingly, many of the factories are equipping rooms as auditoriums, with pianos and comfortable seats. These places will be the scenes of factory 'sings' in rainy weather. The employers are taking a step still further. A number of them are devoting additional indoor space to courts and wrestling, so that the work can go on unimpeded after the wet weather has set in. Rooms are being equipped in some of the plants for the Americanization classes to be conducted there.

The Y. M. C. A. at 220 Golden

AT LEFT, AMERICAN CAN CO. EMPLOYEES ON THE WAY TO SAN JOSE TO SUPPORT THEIR BASEBALL TEAM. INSERT SHOWS TWO ROOTERS IN ACTION. AT RIGHT, VOLLEY BALL UNDER DIFFICULTIES, BUT THE MEN PLAY IT JUST THE SAME

Generated on 2024-09-30 01:49 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Gate avenue has begun to make provision for the winter season and arrangements are under way to make its big 'Man Building' a social centre for the workers of the metal trades and their families, a place where they may gather for social purposes and for entertainment. Several of these gatherings have already been held, particularly by employees at the various plants of the American Can Co. If any of our readers wish to see a crowd having an all-round good time and getting acquainted without regard to position on the factory payroll, all they have to do is to attend one of these affairs.

"One thing must be borne in mind," said Mr. LeGrand in discussing this vast industrial program. "The Y. M. C. A. does not and will not enter into any phase of labor disputes or controversies. It is not our province to enter into difficulties of that kind.

"But what we are distinctly aiming at is to create the spirit of co-operation between employees and employers, which always increases with acquaintance and with doing anything in common.

"I am satisfied that already that spirit of co-operation has been keenly developed among those in the metal trades who are availing themselves of our program.

"Our position is strictly non-partisan, it is more than neutral, it is mutual. We realize that the greatest factor in production is the human factor, and the greatest element in the human factor is the spirit. Human efficiency involves physical, mental, and spiritual standards. That is the significance of the 'Red Triangle'. Sustained efficiency is impossible without a character basis. So, too, is sustained happiness. Because the Association's product is all-around character, it serves the employers' best interests.

"We also realize that the great need felt by employees is a greater fraternity, recognition of their relations as men as well as workers. Not wages, hours, or conditions alone, but relationships are the great concern of the workers.

"With increasing democracy in industry, individual character becomes more important. No safe fraternity is possible without a character basis. This goes for all concerned."

Forging Large Ingots

A paper presented at the Chicago meeting of the American Institute of Mining and Metallurgical Engineers by F. E. Bash, research engineer for the Leeds & Northrup Co. describes some tests made in forging a 24-in. round ingot. The following conclusions are given:

It is possible to heat a 24-in. forging ingot from room temperature to forging temperature in seven hours, but there is danger that this rate will be injurious to the steel, especially while the steel is comparatively cold, large stresses being set up that may cause internal fissures. The rate at which an ingot may be heated depends on the kind of steel, chrome-steel being more susceptible to injury than low-carbon steel, which will stand more abuse. Opinions differ as to the length of time required to bring an ingot of this size up to forging temperature, but the best practice provides for relatively slow heating until the critical temperature is reached.

It is difficult, if not impossible, to calculate the stresses at any one point in an ingot, because of unequal expansion, and in that way determine what the maximum allowable difference in temperature between the outside and the centre will be. If this could be done, it would be a simple matter to prescribe the rate of heating that any size ingot should have. The main source of information is the experience of steel-men through years of practice on forging large ingots.

The results of the test show that an optical pyrometer can be used to determine when an ingot is ready to forge. To make sure that there is no error due to loose scale or ash, it is well to push a bar in the furnace and clean the spot on which the pyrometer is to be sighted. This being done, if the surface temperature is 100°F. higher than the temperature at which it is desired to forge, the ingot is ready to pull out. For instance, if the forging temperature is 2250°F. and the optical pyrometer reads 2350°F., the ingot is ready to forge. The outside temperature of the ingot will drop rapidly in the air and leave the centre the hottest portion; for a 24-in. ingot, the difference between the outside and centre is about 100°F.

The optical pyrometer can be used to determine gas temperatures approximately by sighting on the bricks of the back-wall or by sighting on a target or in a tube. Usalite porcelain stands the forging furnace temperature well and quickly changes temperature with the gases, as will a target of thin metal. The target, however, does not stand the corrosive action of the gases for any length of time, a nichrome target lasting to a temperature between 2200°F. and 2300°F. The error caused by making a reading through a light flame is approximately 20°F. Readings through light ash from a powdered-coal flame, with an optical pyrometer, do not appreciably affect the temperature read.

A couple on the surface of a large ingot may indicate a temperature approximately that of the gas and much above that of a point in the steel $\frac{1}{2}$ in. under the surface.

The temperature gradient along the ingot from the door to a short distance inside the door is large and must create serious stresses at that point.

From the rate of cooling of the 24-in. ingot, it appears that it can be worked for two hours without becoming too cold. This may not actually be the case as the thick scale drops off and the piece is worked down to smaller dimensions where it will cool more rapidly. On the other hand, working heats the piece and will tend to counterbalance more rapid cooling.

The amount of coal used in this test was approximately 0.25 lb. per pound of steel. The average amount of coal used for production work at this plant was 1 lb. per pound of steel. This shows that the furnaces can be fired much more efficiently.

Generated on 2024-09-30 01:57 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Foundry of the Utah Copper Company

By FRANK G. JANNEY

In 1910 the foundry was in a small, poorly lighted and ventilated building 61 by 62 ft. Outgrowing this small building, a new shop was completed in the early part of 1911, the building being 80 by 120 ft. Remodeling and additions to the mills and the building of the Bingham & Garfield railroad increased the work to such an extent that the foundry was lengthened 75 ft. in 1912, 30 ft. in 1915, and 90 ft. in 1917. Today the main building of the foundry covers a space of 80 by 315 feet.

After allowing for chipping-room, core-room, and cupola-space, the molding-floors have an approximate area of 16,000 sq. ft. The foundry equipment is modern in every respect, making work-conditions ideal. In the core-room are modern oil-fired furnaces. The crane equipment includes two 15-ton traveling cranes in the central bay and one 3-ton electric traveling crane in the side bay. Both of these cranes run the entire length of the shop. Two gib-column cranes of 2000-ton capacity are in the core-room.

The iron foundry is equipped with No. 3, No. 5, and No. 7 Whiting cupolas, having a capacity in excess of 150,000 lb. per heat. The air-blast is furnished by three Westinghouse centrifugal air-compressors with a capacity of 19,200 cu. ft. per minute. The amount of air is registered by two Clark blast-meters. Cinders and foundry waste are handled by a Link-Belt elevator-hoist to the disposal yard.

Castings leave the chipping-room on cars, cross a set of scales, and are delivered to the machine-shop casting-yard or loading-dock. The charging-floor is built of steel and concrete, covered with square wooden blocks set on end and wedged with asphaltum. Circulation of fresh cool air, combined with good light and plenty of room, make a perfect charging-floor.

In the iron and coke yards, which are on a level with the charging-floor, are concrete bins for storing molding-sand, pig-iron, and scrap. All material in the material yard is handled with a 20-ton electric locomotive crane, equipped with magnet. This crane does all the unloading of material, handles the drop at the breaking-pit, and also handles the large boats into which the coke is loaded for delivery to the charging-floor.

The brass foundry is placed in a building separate from the iron foundry and is equipped with three oil-fired blast-furnaces, with a total capacity of 9000 lb. per day. Brass castings vary in size from a few ounces to 800 lb., and in quality from yellow brass to the best grade of bronze.

The pattern-storage building is 126 ft. long, 64 ft. wide, and 41 ft. high; it consists of three floors equipped with pattern-racks. It is modern in every respect and approximately 10,000 patterns are kept in storage.

The largest production of castings in one month was 1,800,000 lb., in October 1917.

Epuipment of U. S. Repair Ship 'Prairie'

One of the most interesting features of the Pacific Fleet which arrived on this coast last month is the repair ship 'Prairie'. This vessel is known as the mother ship of the destroyer squadron and takes care of the emergency repairs of some 24 destroyers. A destroyer is practically all machinery and 24 of them keep the crew of the 'Prairie' busy making repairs and manufacturing spare parts. A great variety of work has to be done, including the manufacture of spare parts for the gasoline engines of the launches and the replacement of any parts that are needed. All sorts of pipe-fittings are made, also repair parts for the engines, guns, and other equipment.

In two rooms on one of the upper decks, each approximately 25 ft. square, are a foundry and a forge-shop. The foundry is equipped with a 28-in. cupola, an 18-in. cupola, and two tilting brass-furnaces which take about a No. 80 crucible. The largest iron casting made recently was part of a turbine-casing weighing 1800 lb. finished.

The forge-shop is equipped with a steam-hammer, a pipe-bending machine, and plate-bending rolls. It is also equipped with furnaces for casehardening and tempering.

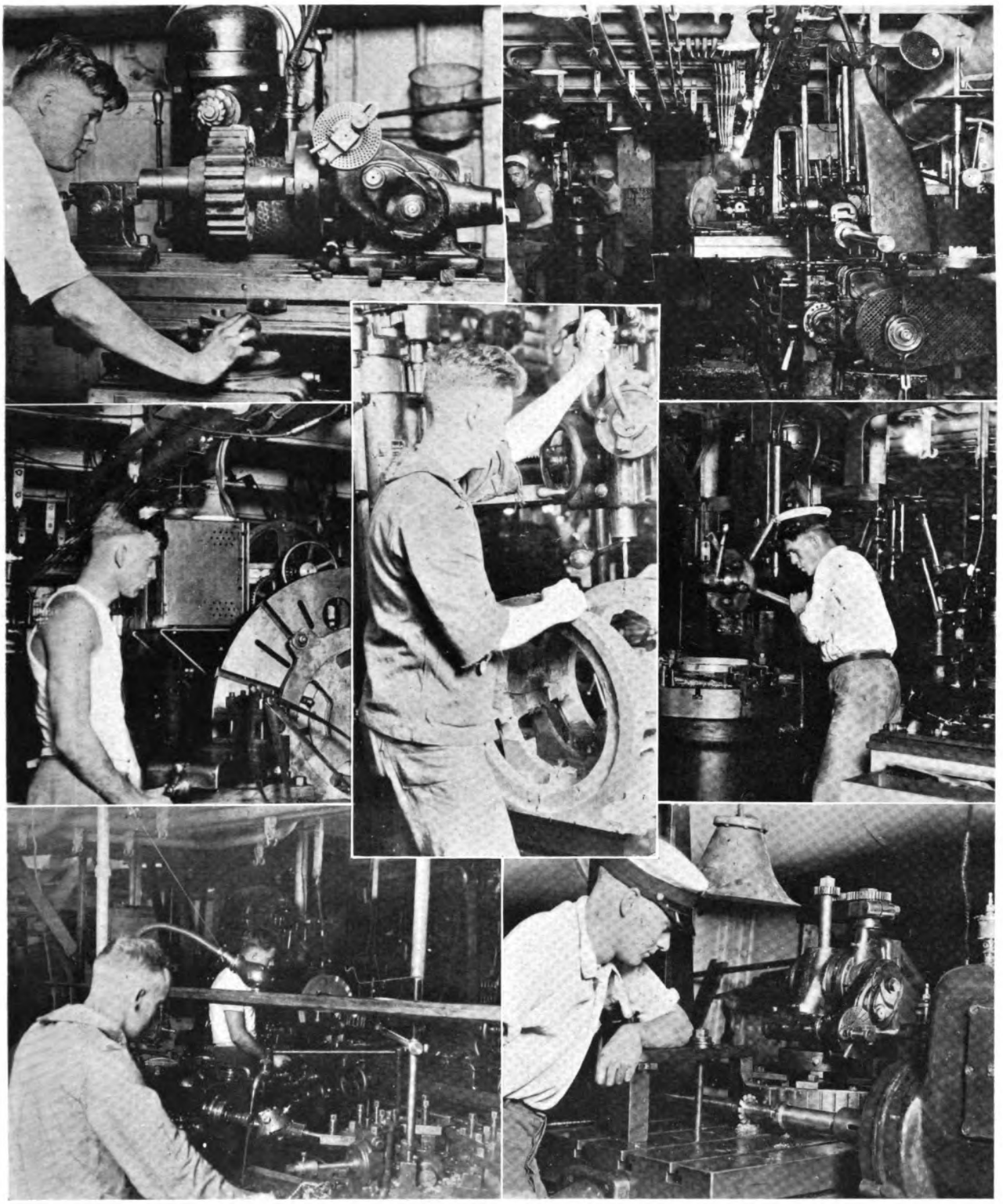
In another part of the ship there is a pattern and carpenter shop, which is well equipped with modern wood-working tools. The large variety of well-made patterns in the storage-room testifies to the great variety of work that has been done. The room resembles the pattern-storage of a job-shop. This storage-room was also the home of a Panama spider-monkey, a pet as well as an efficient cockroach exterminator. A peculiarity of the pattern-shop is that it is housed in the same room with the barber-shop.

The machine-shop, which, in the words of a land-lubber, is situated in the basement, is particularly well-equipped. Among the tools are eight engine lathes, the largest having a 16-in. gap and a 20-ft. bed, two shapers, one 16-ft. planer, two milling-machines, one 42-in. vertical boring-mill, one 3A Universal horizontal boring-mill, one Universal tool grinder, and one cylindrical grinder. There are other miscellaneous tools, including drill presses, bench-lathes, etc. The tool-room has a full equipment of gauges, micrometers, and small tools. A large number of jigs and fixtures are used in the manufacture of parts which are kept in stock. These fixtures conform to the best machine-shop practice.

Not the least important work of these shops is the training of mechanics. All the facilities are present for making a first-class mechanic during the term of the sailor's enlistment.

The Navy promises to teach a trade to its enlisted men, and it is on such vessels as the 'Prairie' as well as in the navy yards that the men get their training. From observations of the work of sailors that had served less than one enlistment, the writer would judge that the Navy is a better place to learn a trade than the average commercial shop, where the tendency is to train merely machine specialists.

Generated on 2024-09-30 01:52 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN



In the Machine-Shop on Board the 'Prairie'

UPPER LEFT, CUTTING A GEAR ON A No. 1½ MILWAUKEE MILLING MACHINE. MIDDLE LEFT, REPAIR WORK ON A 60-IN. LATHE. LOWER LEFT, MANUFACTURING SPARE PARTS ON A JONES & LAMSON TURRET-LATHE. UPPER RIGHT, STARBOARD SIDE OF THE SHOP. MIDDLE RIGHT, 42-IN. GISHOLT BORING-MILL. LOWER RIGHT, SPECIAL RIG FOR MILLING A LARGE GEAR. INSERT, 38-IN. RADIAL DRILL.

Generated on 2024-09-30 01:50 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Employment Management and the Industrial Future of the Pacific Coast

By ROY WILLMARTH KELLY*

FEW social or industrial movements can parallel employment management in extent and rapidity of growth. The first employment manager in the United States was probably O. T. Schwartz, who started in a small way with the B. F. Goodrich Co. at Akron, Ohio, about 1900. Aside from sporadic attempts to interest employers in 'welfare' activities, very little attention was devoted to systematic personnel work previous to 1912. In that year, the Boston Employment Managers' Association was formed to study ways of improving methods of handling labor. There were less than half a dozen charter members of the Association who could call themselves employment managers in the sense in which the term is now used; the remainder were superintendents, works managers, teachers, and others who were interested in labor matters. At that time there were probably less than a dozen concerns in the United States having completely organized industrial relations departments. The employment management movement was then unknown and even now has made little progress in Canada or in Europe. There are now 33 local Employment Managers' Associations in various parts of the United States and a strong National Association.

Those having any questions as to the growth of the interest in this movement and its probable effect upon industrial progress would have had all their doubts swept away by attending the Second Annual Conference of the National Association at Cleveland in May 1919. The registered attendance was 1006, and so large a number of influential men and women were present that L. P. Alford, editor of 'Industrial Management', was led to say that a proportionate growth during the next few years would give a size and standing to the National Employment Managers' Association unequaled by any other society dealing with technical problems in industry.

Up to the present time this movement has not received the amount of attention on the Pacific Coast which its significance merits. Two or three excellent courses have been given in employment management and several promising organizations of men interested in personnel affairs have been formed. Nevertheless, the fact remains that but few companies have organized service activities, managers and superintendents are not members of and do not attend the meetings of the Employment Managers' Associations, and only a limited amount of work is being done by educational institutions to foster the organization and maintenance of employment departments. Vocational education, particularly industrial training of a kind adapted to the needs of individual industries, has received only scant attention and the courses offered have been based only rarely on a study of the actual demands made upon the employees in their daily tasks.

By way of contrast, the Boston Employment Managers' Association has a regular attendance at its monthly meetings of from 150 to 250 members. Rochester has, for several years, profited by activities of a large group of men who have held interesting monthly meetings and made several important contributions to the practical solution of their local problems. The leading Eastern universities such as the Carnegie Institute of Technology, Harvard University, and Columbia University, have established strong courses in employment management, vocational guidance, and vocational education. New York city has an excellent institution in the new school for social research which is training labor leaders, employment managers, vocational counselors, and research workers. Only recently, a number of well-managed private bureaus have entered the field of consultation and research, and the number of firms doing good work is growing daily.

In view of the number of manufacturing establishments and business houses now in need of assistance in solving their questions of labor maintenance and in view of the probable industrial and commercial developments during the next few years, it is reasonable to ask what developments can be expected on the Pacific Coast. Two facts need to be borne in mind, which in part explain the present undeveloped state of employment management in California, Oregon, and Washington. First, the Pacific Coast has been primarily engaged in agriculture, mining, lumbering, and transportation. In the second place, the manufacturing plants and commercial houses, although increasing rapidly in numbers, are still, in the majority of cases, relatively small in size. In the city of Oakland, for example, there are over 500 manufacturing plants, but less than a score of these employ more than 300 persons. The essential questions which employers and employees alike must face are, 'What are the labor problems peculiar to the Pacific Coast, and what has the experience of Eastern employment managers to offer

*Specialist in vocational education and plant surveys for the Pacific Coast Bureau of Employment Research and director of education and personnel research for Roos Brothers.

Generated on 2024-09-30 01:52 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

that may be helpful in improving present conditions and safeguarding the future?'

Briefly stated, the task of the employment manager is to recruit, train, and maintain a stable efficient working force. In some respects he may be said to practice the profession of human engineering; he prepares specifications and schedules of labor needs, selects his material with care, adapts it to the demands of his concern, and applies scientific principles in developing and maintaining working efficiency. But there are important points at which the analogy with engineering breaks down. The really efficient employment manager is not engaged in 'handling men'. He works with men in a co-operative enterprise, helping each party to the undertaking to render the maximum service and derive the greatest possible benefit from the association. In all matters affecting the labor contract or employment conditions, he is the immediate representative of three separate interests, management, labor, and the local community. Indirectly he must also voice the best interests of capital and the public. Each of these groups he must protect, serve, and interpret to the others. Wherever employment managers have broken away from the tendency to become mere clerks, doing nothing more than select applicants and maintain records, and have adopted this wider conception of their place in the community they may properly be called 'service managers'. This name has been widely adopted by many concerns such as the Hood Rubber Co., Watertown, Massachusetts, the Merchant Shipbuilding Corporation of Bristol, Pennsylvania, and the American International Shipbuilding Corporation of Philadelphia. The actual accomplishments of these departments more than justify their right to claim the confidence and support of employers, employees, and the public.

What are the functions of an employment or service department?

Historically the employment department may be regarded as an outgrowth of several modern movements, some of them of general public interest and others confined more strictly to industrial management. Among them are the general drift in administration toward staff departments, or functional management; the evolution of cost accounting; campaigns for safety, sanitation, and hygiene; the vocational guidance movement; enactment of factory legislation and labor laws; and general progress in applied psychology, sociology, and medical science.

Successful industrial experience has made clear the need for a general manager whose principal duties consist in translating the aims and policies of the concern into action, and in correlating or harmonizing the work of the several departments in which the organization is divided. To accomplish this the general manager must have the assistance of specialists who concentrate upon a limited field, acquiring the specific information upon which decisions are based and plans are executed. Recent experience has demonstrated that the functions centred in the service department are fully as important and can be as clearly defined as those which have already been segregated under the cost accountant, the sales manager, or the superintendent of production.

Centralized control of personnel work relieves the foreman quite as much as the general manager. Most manufacturers have already taken from the foreman supervision over the development of experimental work, the purchasing of raw material and new equipment, the computation of costs, and even the planning and routing of production. If the foreman cannot be expected to specialize in any of these activities, much less can he discharge effectively the time-consuming and highly technical duties relating to the selection, promotion, training, discharging, and welfare of employees.

A service department rightly managed does not mean an increased burden upon the cost of doing business. On the contrary, the service manager ought to be constantly on the alert to discover and eliminate the needless waste in production costs which are certain to be found in any large organization. The service manager ought to be the 'labor-cost accountant of industry'. No factory manager can afford to neglect a careful study of the costs due to labor turnover, to absenteeism, to tardiness, to accidents, to injuries, to untrained men, and to unskilled persons who have been assigned to tasks for which they are unfitted.

Labor costs have been reduced in plants under good management by three important measures; first, care in the initial selection, which includes developing the sources of labor supply both within and without the organization; second, by training new employees; and third, by making the necessary provisions for maintaining the efficiency of the labor force. In the main it is possible to describe all the functions of employment management under these three heads.

Provision must be made for new recruits. This involves a knowledge of all available sources of labor supply. The keeping of adequate records, training and maintaining a staff, interviewing and selecting applicants, the preparation of specifications for hiring that approximate in their accuracy specifications for raw material, machinery, or buildings, a careful 'follow-up' of new employees to check up the work of the employment bureau, and making transfers and promotions, is a field which varies widely in its demands in different occupations and in different plants. The new employee may require, in one case, only one or two hours of preliminary instruction to acquaint him with the new environment and the essential features of his new task. Another position may require a four-year apprenticeship followed by a series of educational opportunities intended to develop a high degree of trade skill and technical knowledge.

Labor maintenance in many plants has come to include a large number of highly specialized functions; provision for shop committees, the reduction of absenteeism and tardiness, the handling of complaints and grievances, the supervision of shop discipline, plant sanitation and safety, first-aid and general hospital treatment, the reduction of fire hazards, the maintenance of a cafeteria, or the supervision of housing, athletics, a co-operative

Generated on 2024-09-30 01:56 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

store, an employees' journal, and Americanization. The mere enumeration of such a list shows how important are the duties which a service manager may be required to perform and how carefully the manufacturing plant and business house ought to consider any step which is taken in the direction of organizing an employment department.

The health of employees.

As an illustration of one of the most successful features of employment work, the supervision of medical examination, first-aid, and other medical activities may be offered. There is ample evidence of an awakened public interest and well defined industrial movements which have crystallized in hygiene, safety, and sanitation as extremely important functions of the service department.

The proportion of defective persons discovered among the young persons drafted for military and naval service is described by Charles W. Eliot, president emeritus of Harvard University, as a source of surprise and mortification to everyone. Not less than 35% of the young men between the ages of 21 and 31, examined in the first draft were found to have serious physical handicaps. This result is not surprising to one who is acquainted with the statistics kept by cities in the United States, which have had some adequate form of medical supervision of children in the public schools. Recent statistics based on the examination of large numbers of school children show that nearly 50% have defective teeth, 20% have serious throat trouble, about 13% have enlarged glands, 10% have defective eye sight, and 10% have various forms of nasal complaints. A total of nearly 65% of the children in our public schools suffer from malnutrition, tuberculosis, or some serious physical defect. This means that approximately the same percentage of people who apply for employment are not capable of rendering service to their employers that is 100% efficient.

Robert Quimby, in a paper read before the May 1919 meeting of the National Association of Employment Managers, made the following statement: "The physical examination of industrial workers naturally does not follow just the line of the army examination, but roughly we find the following percentage of some of the more important defects:

Defects	%
Gross dental	30
Gross defects of vision	10
Hernia	7
Pulmonary defects	4
Heart lesions	4

"Obviously such defects present a very definite problem from an industrial relations standpoint. Is it good business to invest our money in these defective human machines? Can these conditions be remedied? If so, how and by whom? How can these individuals be employed so as to be productive and be a menace neither to themselves nor their employers? What shall be the supervision of these cases during employment?"

A research bureau to study employment on the Pacific Coast.

If the success of the industrial future of the Pacific Coast is to be assured we must avoid some of the mistakes of the great industrial centres of the Atlantic seaboard. The textile mills, many of the plants engaged in the boot-and-shoe industry, the older shipyards, and the majority of the steel manufacturing enterprises have suffered for many years because of badly adjusted labor conditions. The Pacific Coast will be able to attract new enterprises and will see a steady growth in its present concerns in about the same proportion as we are able to utilize the best of recent developmentts in progressive concerns, and avoid the traditional heritage of bad labor policies. Because of the fact that many of our establishments are small and cannot afford to undertake service management of the kind we have outlined above, there is an important work to be done by associations of manufacturers, by educational institutions, and research bureaus. The small plant that cannot afford to hire high salaried staff specialists must look to some such agency for assistance. Any bureau, manufacturers' association, or educational institution that can bring together a group of trained men, who will render general services, which can be made available to all concerns and at the same time help individual plants in doing specific pieces of work requiring technical knowledge or training in the employment field will be in a position to make a valuable contribution. Such a bureau was established by the writer two years ago at Harvard University. The record of less than one year and a half of work shows the following varied accomplishments:

1. Over 130 men and women have been instructed in employment management through Government courses. Thirty students, nearly all of them now employed in personnel work, were enrolled during the spring of 1919 in a part-time course in employment management given by the Harvard Bureau with the co-operation of the Massachusetts Institute of Technology, Boston University, and the Boston Employment Managers' Association.

2. A study of the shipyard trades was made during the early part of the War for the Emergency Fleet Corporation, and over 30,000 copies of the bulletin prepared by the Bureau were distributed.

3. In co-operation with the Red Cross Institute for Crippled and Disabled Men, surveys of New England's leading industries have been conducted in order to help in planning for the placement and re-education of injured soldiers and sailors as well as others who suffer from physical handicaps.

4. Arrangements have been made to assist several firms in organizing or improving their work in employment management, training employees, and Americanization.

5. A large number of individuals have received advice and help in personal vocation problems, and assistance has been given to schools and business houses in a variety of ways on minor questions.

6. Several books and bulletins have been published and articles have been contributed to educational and technical journals.

Generated on 2024-09-30 01:50 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

7. The Bureau is now assisting the Harvard Medical School in the work of editing the 'Journal of Industrial Hygiene' and will later help in the training of industrial physicians.

8. The entire time of one member of the staff is now being devoted to counseling with returning soldiers and sailors in connection with the community employment office in the 'Liberty Cottage' on Boston Common.

A similar bureau is now being established in San Francisco under the title of the Pacific Coast Bureau of Employment Research. The staff includes a number of men that have had wide experience in industrial concerns and in doing personnel work in the army. They will make available to employers and to labor leaders, material which will be collected from cities throughout the United States where noteworthy contributions are being made on labor matters. Its staff will be available for supervision of plants, for consultation on labor problems, and for assistance in organizing and developing employment departments. Such an enterprise ought to receive the co-operation of all who are interested in the future of our Pacific Coast cities. The staff of the Bureau will be maintained on a salary basis and if any profit accrues from its operations it will be utilized in developing the resources and increasing the staff of the Bureau. An appeal is being made to commercial establishments to support this enterprise on a purely business basis. It has a right, however, to expect support and co-operation from many who will feel its work is one means of safeguarding the present and the future of both labor and capital.

One of the important functions which such a bureau may well discharge is that of rendering assistance in preparing and criticizing labor legislation. If we may judge by the experience of the past few years, the next decade will see the enactment of a large body of State and Federal labor legislation. Organized opposition and wholesale denunciation of this tendency are largely fruitless. The alternative is to develop staff assistants in employment departments, who will keep records and engage in research studies to furnish the data upon which better legislation can be based. The National Employment Managers' Association, local employment organizations, and institutions such as the Pacific Coast Bureau of Employment Research, ought gradually to come to the place where they can exercise a profound influence upon the course of legislative action. No other group of persons will be in a position to see the needs of labor so clearly nor to interpret them so sympathetically.

Another important piece of work which a bureau of this kind may attempt lies in the field of applied sociology and psychology. It is only rarely that a firm without centralized employment is able to co-operate effectively with vocational guidance agencies or with other organized efforts to improve social conditions in the community. Still less frequently do such concerns attempt experimental or research work in the province of human relations. Both applied psychology and sociology have opened extremely attractive avenues for study and experimentation. The solution of the problems of fatigue, the use of non-financial incentives, increased enjoyment of work, the selection, training, and advancement of employees, and the adjustment of machines and methods to suit the psychology of the worker are examples of matters which ought to be approached through the application of scientific principles and methods. But so long as these new movements remain in the experimental stage, industry can expect to get little more than suggestions as to points of departure from the scientist or social worker unacquainted with the practical details of manufacture or business. Substantial advancement is now being achieved and can be expected in much larger degree through the efforts of trained men and women who approach these questions from the practical-scientific point of view of staff specialists.

Proposed System of World Aerial Transportation

A large British company, financially well supported and in which Messrs. Vickers are said to be interested, proposes to put into execution a world-embracing plan for passenger airship transportation. Routes have been planned so that no important city will be over 10 days' air journey from London, the following being the chief main lines and times occupied in making flights from London:

London to	Miles	Days
New York	3000	2½
San Francisco	6200	4½
Cairo	2050	1½
Colombo	5450	4½
Perth (Australia)	8600	7
Nairobi	4150	2¼
Capetown	6350	5½

The trip from London to Capetown will include a 12 hours stop at Nairobi. Cairo and Lisbon are to be two of the traffic junctions, the former (which will be reached from London by way of Tunis) for the southern route to Capetown by way of Nairobi, and for the eastern route to Sydney by way of Aden, Colombo, and Perth. West of London the first stop is to be at Lisbon, whence the trip to New York and San Francisco will procees by way of the Azores, and to Rio de Janeiro by way of Sierra Leone.

It is pointed out that while the speed of airships is less than that of aeroplanes, it is five times greater than that of the average ocean liner, and a non-stop flight up to 10,000 miles is possible. The proposed fares from London will be: To New York, $243; to Capetown, $876; and to Australia, $696. This is approximately $0.08 per mile. Mail will be carried at $0.06 per ounce. The proposed type of airship is to have a capacity of 3,500,000 cu. ft., and to be capable of a speed of 60 miles per hour and of carrying 15 tons of passengers and mail a distance of 4500 miles.

Generated on 2024-09-30 01:49 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Gauging and Interchangeability*

By E. C. Peck

THE first interchangeable manufacture attempted was in France in 1717, and it failed. Another trial was made in 1785, which also failed. In 1798, Eli Whitney, of cotton-gin fame, took and completed a contract to make 10,000 muskets for the United States government. The parts of these guns were interchangeable. English and French ordnance officers ridiculed the idea to such an extent that Congress became alarmed at the money being used for this purpose. Whitney went to Washington with ten guns and distributed the parts on the floor, then assembled repeatedly from these parts ten guns that operated properly. This was probably the first successful interchangeable manufacture of accurate work. Ever since these small beginnings were made, America has led the world in methods of interchangeable manufacture.

The first successful interchangeable manufacture was by Eli Whitney about 1798.

There are several degrees of interchangeability, or, at least, several meanings to the exact interpretation of the word. Strict interchangeability consists in making the different parts of a mechanism so uniform in size and contour that each part will fit and function properly in any one of the whole number of mechanisms, no matter when or where it is made.

It is a fundamental law that interchangeable manufacture is facilitated by the largest allowable freedom in the fit of mating parts without interfering with the proper functioning.

This leads to allowances and tolerances, one of the simplest but least understood subjects in the whole system of interchangeability. As these two words are used repeatedly, it is well to point out the difference between them.

Allowance is a prescribed difference between the dimensions of two mating parts to produce the desired kind of fit. Take, for example, a standard hole 1.000 in. diam., with a free-running shaft, whose journal diameter is 0.998 inch. The allowance is 0.002 inch.

Tolerance is the prescribed difference in the dimensions to tolerate the unavoidable errors or variations in manufacturing a large number of pieces. In the above example, the holes might be dimensioned 1 in. plus 0.005 and minus 0.0000. This 0.005 in. permissible error is the tolerance. The shaft-journal might be dimensioned 0.997 to 0.998 in., and this permissible error of 0.001 in. is the tolerance. Then the minimum allowance is 0.002 in. and the maximum looseness, or the sum of both tolerances and the minimum allowance is 0.0035 inch.

Thus the kind of fit is finally determined by the combination of allowance and tolerance, and most engineers prefer to use allowance as a minimum value, upon which encroachments are never made intentionally, the tolerance providing for larger freedom of fits. The reason for this is that the data for minimum allowance are more reliable and have been more clearly demonstrated than the maximum allowance, and as it is vital, it must be unaffected by tolerances. This is particularly true for free-moving parts, as a space must be provided for an oil-film, and this space must not be so small as to make failure possible because of the parts seizing.

Most engineers prefer to use allowance as a mimimum value, upon which encroachments are never made intentionally, the tolerance providing for larger freedom of fits.

There are many conditions where maximum looseness determines the strength of the parts or the limits of engagement, and any more freedom of fit would make the parts unsatisfactory. Under such conditions, maximum looseness must be the starting point in the calculations. Then if minimum allowance can be determined, the difference between these two, maximum and minimum looseness, will be the sum of the tolerances.

The tolerances are then divided between the mating parts according to the manufacturing ability to produce the parts to uniform size. That is, if the manufacturing ability is such that it is much easier to produce uniform size in one member than the other, the tolerance on the members is divided in direct proportion to this condition.

Often the allowance has zero value; that is, there is no clearance allowed for the fit, and in a single pair of mating parts, they fit metal to metal. If a large number of such parts are to be made, it must be determined whether this zero allowance is for the tightest or the loosest fit permissible.

The term 'negative allowance' is often used to indicate that we allow a certain prescribed amount to make a tight or force fit. According to present usage, zero allowance indicates that there is no clearance or space allowed between the two mating parts. Positive allowance indicates that a space is prescribed between the mating parts. Negative allowance indicates that there is less than a space provided between the mating parts, or an imaginary space displaced by the flow of the metal to make a tight fit.

*Abstract from paper presented before the American Society of Mechanical Engineers.

Generated on 2024-09-30 01:56 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

The minimum allowance or the greatest tightness and maximum looseness should be known when the tolerances are set. There are, however, cases in which it is known that certain tolerances are the smallest that can be successfully used in manufacture, and then maximum looseness and maximum tightness must be adjusted to obtain the best functioning.

The minimum allowance or the greatest tightness and maximum looseness should be known when the tolerances have been set.

After determining the maximum and minimum looseness of mating parts and setting the tolerances, it becomes necessary to control the dimensions of the parts so that none of the dimensions will be outside of the limits established, and this is best done, for strictly interchangeable manufacture, by the use of proper 'go' and 'no-go' gauges. First-class gauges are expensive, and soon wear, so that strict interchangeability is sacrificed to keep down gauge cost.

In times past it was common practice to use 'go' gauges only, and to limit the looseness of fit by the 'shake' of the piece in the gauge, or where a little more refinement was practised, a piece of newspaper was used on one side of the 'go' gauge, and if the piece that passed without the paper was tight with the paper, it was accepted. A piece of newspaper used with each of a pair of mating 'go' gauges usually produced a freedom of fit from 0.004 to 0.006 in., and with skilled help, it produced satisfactory results.

For strictly interchangeable quantity-production work of good character, a good gauging system will prove economical. Such a system comprises the minimum number of properly designed gauges to control all the factors of the various parts of a mechanism, so that they will assemble and function properly. This assumes that proper allowances and tolerances have been established.

The designer should keep before him the fundamental principle that tolerances should be as large as proper functioning will permit, and he should be well informed what tolerances successful manufacturers actually observe. He should take pains to learn how tight and how loose working parts actually can be and yet give satisfactory results.

Tolerances should be as large as proper functioning will permit.

Once these tolerances are set as large as the designer will risk, they should be rigidly observed, and considered a boundary line. The product should always be kept within these boundary lines, and this is best accomplished by making the component drawing dimensions the master-gauge dimensions. Then with all the working and inspection gauges checked against the master-gauge, and never allowed to wear beyond master-gauge dimensions, the work is bound to be within component dimensions.

As exact duplicate master-gauges cannot be made except at a prohibitive cost, a master-gauge manufacturing tolerance is allowed. This tolerance is usually in good practice from 4 to 5% of the component tolerance, and is applied in the direction to keep the work within the boundary line defined by component dimensions. This gauge-tolerance is treated as a wear-limit, and robs the working tolerance by this 4 or 5%.

Inspection-gauges are usually of the same design as the working-gauges, and often the same as the master-gauges, but should have an additional allowance for wear. Inasmuch as the gauges will wear, and as they are expensive, the exact amount to allow for wear is an economic point for each manufacturer to decide, keeping in mind that a small wear-limit increases the gauge-cost, and a large wear-limit requires closer attention and work at the machines.

Where experience is lacking, it is good practice to allow 10% of the component tolerance for wear on the 'go' gauges; as the 'no-go' gauges wear but little, 5% will be sufficient. The working-gauges are those used to check the work as it is machined, and should have liberal wear limits to ensure the work being passed by the inspection-gauges.

Working-gauges should have liberal wear-limits to ensure the work being passed by the inspection-gauges.

Thus it will be seen that this system, if followed, will admit of the acceptance of work that will be interchangeable. It also emphasizes the fundamental that tolerance should be as large as will permit proper functioning.

If the tolerances are too small, the work will be costly, because better workmen will be required, and this always means higher wages. Better tools and machines to produce the close work, and more frequent adjustment and attention is also necessary as well as additional gauge cost. Close tolerances cause large rejections of the work, also friction between the inspector and those responsible for the work.

The examples and descriptions so far have applied to all kinds of interchangeable work with no particular reference to screw-thread work, and while the principles and practice are the same, a great deal more care is required to produce strictly interchangeable screw-thread work than plain work. The problem becomes more difficult because a larger number of factors make up a proper screw-thread fit, and a big error in any one of the factors will prevent a proper fit. A comparison of these factors may help to make a solution more comprehensible. A cylindrical fit depends upon the size, rotundity, and parallelism of the mating parts. Rectangular sliding-fits depend upon size, contour, and parallelism of the mating parts. Of course, they all depend upon size, but in a screw-thread fit, size is affected by the errors of the lead in the mating parts, and the errors in the angle of the thread. Thus the contour factor in a screw-thread is made up of the factors of lead and form of thread.

Two mating parts with correct lead require no compensation in size for the lead factor. Two mating parts with an equal lead error in the same direction, either long or short, require no compensation in size for the lead error. Two mating parts with differing lead errors or the equivalent, require a compensation in size for this lead difference to enable the mating parts to go together.

Two mating parts in which the contour of the thread is affected by an error in the angle of the flanks of the thread, must also have a compensation in the diameter to

Generated on 2024-09-30 01:56 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

offset the angle error, or the metal must flow to make the fit. Thus it will be seen that strictly interchangeable screw-thread products are more difficult to obtain, and if good fits are required, close tolerances and good thread-producing tools are necessary. There must be a rigid inspection and means of controlling all factors which make a fit.

Where gauges are used, they must be periodically checked against the master gauges. It is fundamental that the 'go' gauges should check all the factors simultaneously, and the 'no-go' gauges should check the factors separately. This must be obvious when it is remembered that lead and form are compensated by increasing the diameter, and hence to be sure of the correct relation of all the factors to each other, they must be gauged at once.

Six-Hour Day in Great Britain

A British firm of soap-manufacturers, Lever Bros., have, of their own volition, gone on a six-hour day basis at their factory at Port Sunlight, England. The details of the plan are given by Lord Leverhulme, president of the concern at a meeting on March 27 last, as follows:

"Now, I come to mention some new developments. The first in importance is the proposed adoption of a six-hour working-day. We had intended to do this 12 months ago, but the cutting down of our raw-material supplies rendered it impossible. But we have now worked out our scheme, and I may tell you that all the trade unions consulted are most anxious to make the scheme workable and satisfactory, and that the Government, as far as the state of the law will permit, are equally anxious. It is anticipated that the consent of the Home Office will be given to the draft proposals which have now been submitted to them. The general features of the scheme are, first, with regard to day-workers and piece-workers, that we shall work in two shifts—six hours each shift. The morning-shift will commence at 7 o'clock, and, after a break of a quarter of an hour from 8:45 for some light refreshment, they will continue to work until 1:15 p.m. At 1:15 the morning-shift work for the day will be over. They will not return to their work until 7 o'clock the next morning. This makes a total of six working-hours per day, with 15 minutes break for a meal, for six days in the week, Monday to Saturday included. When we come to consider the afternoon-shift, there is a strong feeling and desire to retain the Saturday afternoon half-holiday; and to meet this wish the afternoon shift will only work five afternoons, the average being 7 hours 12 minutes each afternoon, instead of six afternoons of six hours. Therefore, the afternoon-shift will commence at a quarter past 1 (there will be a break of half an hour for refreshment from 4:45 to 5:15) and will stop at 9 p.m., but on Friday, work will stop a quarter of an hour earlier at 8:45, so that the weekly average is 36 hours. With regard to the shift-workers—that is, continuous workers—to divide the 24 hours into four shifts of six hours each instead of three shifts of eight hours each, which is our present working-day, would create a difficulty with the night-shift. Home life must be considered, and home life requires that a man on the night-shift should leave home somewhere about 9:30 or 9:45, so that the household can be closed and all go peacefully to bed at 10 o'clock; and he should not return until 6:15 or 6:30 in the morning, when the household would be up. To ensure this will mean a little irregularity in the working. It means that on the night-shift a man will work eight hours as at present, starting at 10 p.m., and finishing at 6 a.m.; but this will be balanced by the days when he is only working 5 hours and 20 minutes, and this in a month will give exactly six hours a day, so that one week out of the four a man will be working eight hours at night and the other three weeks he will be working only 5 hours and 20 minutes a day. The shifts will be changed weekly.

"Now, with regard to the light meals. We propose to provide these at the firm's expense, free to the workers. We feel that it will save enormously in time-keeping and actual running, and will simplify the catering. The light refreshments will be tea, coffee, cocoa, bread and butter, and sandwiches, entirely free, at counters adjacent to where the men are working. Neither men, boys, nor girls will require to walk further than is represented by getting out of a railway train and going to the refreshment room. I have tested what you can take at a refreshment room in a quarter of an hour, and I find if I tried I could eat more than is good for me. So that there is ample time for refreshment. The rate of wages will be exactly the same for a 36-hour week as for a 48-hour week. This is obviously essential, but it is equally certain that the staff can accomplish the work without adding any expense to the company by so organizing the carrying on of the work that no increased expenditure will fall on the company. The staff freely recognized in all our discussions that to add to the cost of making soap would be to handicap us not only with firms in the United Kingdom, but with firms all over the world whom we meet in competition in the export markets, so the determination of all of us is that the same wages will be paid and increased leisure obtained without adding to the cost of the article or making prohibitive the expense on the business."

It will be seen that the plan provides for an average, rather than a straight six-hour day. The morning-shift employees work a straight six-hour day, the afternoon-shift works a 36-hour week, while the men employed on work that continues 24 hours, work on four different shifts, and work 144 hours in four weeks.

Lord Leverhulme has already gained considerable notoriety and some fame by his unusual ideas on industrial topics, many of which are expounded in his book 'The Six-Hour Day, and Other Industrial Questions' recently published. His reasoning, however, is severely practical, and he never advocates an unusual scheme unless he is convinced that its adoption would be 'good business', bringing with it profits and other benefits to both the employer and the employed.

Generated on 2024-09-30 01:57 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

National Convention of the American Steel Treaters' Society

The first national convention of the American Steel Treaters' Society was held at the Seventh Regiment Armory, Chicago, September 23-27. Among those presenting papers were the following:

A. W. Anderson, C. S. Gordon Co., 'Modern Pyrometry'. Cyril J. Atkinson, Laboratories, Milwaukee, 'Metallography of Steel'. G. A. Brewster, American Steel Foundries, Chicago, 'Annealing Large Sections of Cast Nickel-Steel'. Shipley N. Brayshaw, London, England, 'Salts for Quenching'. C. P. Berg, C. P. Berg & Co., Chicago, 'Relation of Heat Treatment, Design, and Selection of Steels for Metal-Cutting Tools to Factory Production'. Ray T. Bayless, James H. Herron Co., Cleveland, 'Results of Investigations Pertaining to Heat Treating'. R. P. Brown, Brown Instrument Co., Philadelphia, 'Pyrometry'. Alvin N. Conarroe, Chemist & Metallurgist, National Malleable Castings Co., 'Cast-Steel'. E. F. Collins, General Electric Co., 'Electric Heating of Steel'. Wm. G. Conner, Geo. D. Whitcomb Manufacturing Co., Rochelle, Illinois, 'Casehardening in General'. Arthur L. Collins, Atlas Ball Co., Philadelphia, 'Heat Treatment of Balls for Bearings'. D. R. Cornell, Standard Forgings Co., Indiana Harbor, Indiana, 'Effects of Forging Temperatures on Heat Treatment of Steels'. Wm. Geo. Dauncey, associate editor, 'Iron & Steel', Montreal, 'Heat Treatment of Cast Steel'. Jas. A. Doyle, New York, 'The Function of Oil-Burners in the Operation of Furnaces', 'Factors to be Considered in the Heating and Cooling of Steel'. C. W. Diemecke, Miehle Printing Press & Manufacturing Co., Chicago, 'Steels for Projectiles'. Chas. Eiser, Service Station Equipment Co., Chicago, Ill., 'Casehardening in General'. Charles P. Frey, Philadelphia, 'A New Compensated Heatmeter'. Frank P. Fahy, New York, 'Steel for Electrical Purposes'. Frederick J. Griffiths, Central Steel Co., Masillon, 'Results of Investigations Pertaining to Heat Treating'. Arthur W. F. Green, John Illingsworth Steel Co., Philadelphia, 'Heat Treatment of Rifle and Machine-Gun Barrels'. Fred Grotts, Holt Mfg. Co., Peoria, 'Heat Treatment of Cast-Steel in Tractor Construction'. C. S. Gordon, Claude S. Gordon Co., Chicago, 'Fuel Consumption and Its Waste, as Affected by the Proper Use of Pyrometers and Design of Furnaces,' 'Practical Application of Pyrometers'. T. E. Gladden, Tindel-Norris Co., 'Submarine Crank-shafts'. H. D. Gates, Pangborn Corporation, Hagerstown, Maryland, 'Sand-Blasting'. Wilfred Hanby, Rotherham, England, 'Effect of Heat Treatment and Mechanical Work on Physical Properties of Mild Steel'. N. B. Hoffman, Chief Chemist and Metallurgist, Colonial Steel Co., Pittsburgh, 'Heat Treatment of Steels for Chisels'. Carl T. Hewitt, Fafnir Bearings Co., 'Heat Treatment of Ball-

CHARGING ELECTRIC HEAT-TREATING FURNACE, INSIDE DIMENSIONS 22 FT. DEEP AND 6 FT. DIAMETER

Generated on 2024-09-30 01:51 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Bearing Steel'. H. H. Harris, Swedish Crucible Steel Co., 'Controlling the Cost of Pots and Boxes'. Harry E. Hemstreet, Sheldon Axle & Spring Co., Wilkesbarre, 'Heat-Treatment of Flat Spring-Steel'. L. E. Howard, Simonds Steel Co., Lockport, New York, 'Thin Armor-Plate'. J. L. Harkness, L. W. F. Engineering Co., Inc., New York, 'Results of Various Heat Treatments on Alloy-Steels as Used in the Structural Parts of Air-Craft'. Herman A. Holz, New York, 'Recent Developments in the Testing of Steel and Steel Products'. John H. Higgins, Camden Forge Co., Camden, 'An Investigation on Hot-Rolled and Forged Four-Inch Steel Bars'. S. C. Johnson, Pelton Steel Co., Milwaukee, 'Cast-Steel and Its Heat Treatment'. John J. Jones, of the Pressed Steel Car Co., Pittsburgh, 'Heat Treatment of Tools for Alternate Contact'. Charles S. Kinnison, Hoskin Manufacturing Co., 'Heat Treatment of High-Speed Steel in Electric Furnaces'. Jordon Korp, of Leeds & Northrup, Philadelphia, 'Proper Heat Treatment of Tool-Steel'. W. G. Lottes, International Harvester Co., 'Physical Endurance Tests on Casehardened Parts and Heat-Treated Parts for Motor Trucks, Tractors, and Agricultural Implements', 'Remelting of Broken and Worn Tools of High-Carbon and High-Speed Steel'. John O. Liebig, Lancaster Steel Products Co., Lancaster, Pennsylvania, 'Annealing of Chromium-Molybdenum and Chromium Steels'. D. W. McDowell, Jones & Laughlin Co., Pittsburgh, 'Heat-Treated Wire Steel Products'. William Machan, Briggs & Stratton Co., Milwaukee, 'Heat Treatment of Steel'. Robert P. Maynard, Maxon Premix Burner Co., Chicago, 'Relation of Fuel and Furnace to Heat Treaters'. Roy C. McKenna, Vanadium Alloy Steel Co., Latrobe, Pennsylvania, 'Metallurgy in the Manufacture of High-Speed Steel'. George C. Nixon, Steel Treating Equipment Co., 'Casehardening in General'. J. E. Robinson, J. I. Case Threshing Machine Co., 'Casehardening in General'. Harold J. Smiley, Hayes Wheel Co., 'A New Method for Efficient Combustion of Liquid Fuels'. R. H. Svenson, Production Engineer, Pittsburgh Valve & Foundry Co., 'Heat Treatment of Steel in a Small or Moderate-Size Plant'. T. G. Selleck, Chicago, 'The American Steel Treater: An After-the-War Appreciation'. C. U. Scott, Davenport, Iowa, 'High-Speed Steel'. Alvan T. Simonds, Simonds Mfg. Co., Fitchburg, Massachusetts, 'Helmet Steel'.

The exhibit, which was held in the same building, displayed the most up-to-date equipment of every description for heat treating. The exhibitors included the following concerns:

American Gas Furnace Co., New York, furnaces.

Atlas Crucible Steel Co., Dunkirk, New York, tool-steel, moving pictures.

Edgar Allen & Co., Ltd., Chicago, tool-steels.

Bell & Gossett Co., Chicago, heat-treating supplies.

Alfred O. Blaich Co., Chicago, carburizing materials.

The Bristol Co., Waterbury, pyrometers.

Brown Instrument Co., Philadelphia, pyrometers.

Thos. Buchanan Co., Cincinnati, casehardening compounds.

Colonial Steel Co., Pittsburgh, tool-steel.

Columbia Tool Steel Co., Chicago Heights, tool-steel.

Chicago Flexible Shaft Co., Chicago, furnaces (oil and gas).

Dearborn Chemical Co., Chicago, quenching-oils and rust-preventers.

Denver Fire Clay Co., Denver, gas and oil furnaces.

Ele-Kem Co., Chicago, chemicals for heat treating.

A. Finkl & Sons Co., Chicago, forgings.

Firth-Sterling Steel Co., McKeesport, tool-steel.

Ferguson Furnace Co., Toledo, furnaces.

General Electric Co., Schenectady, electric furnaces.

Gilbert & Barker Mfg. Co., Springfield, Massachusetts, oil and gas furnaces.

Robert K. Greaves, Chicago, tool-steels.

Holz & Co., Inc., New York, precision instruments.

E. F. Houghton Co., Philadelphia, quenching-oils, carbonizing materials.

Hoskins Mfg. Co., Detroit, pyrometers, electric furnaces, heat-resistant castings.

Illinois Tool Works, Chicago, cutters, hobs, reamers.

Ketler-Elliot Co., twist-drills and reamers.

Latrobe Tool Co., Latrobe, Pennsylvania, twist-drills.

Leeds & Northrup Co., Philadelphia, pyrometers and electric furnaces.

Ludlum Steel Co., Watervliet, New York, tool-steel.

Midvale Steel & Ordnance Co., Philadelphia, tool-steels.

Mahr Mfg. Co., Minneapolis, oil-burning equipments.

Maxon Premix Burner Co., Muncie, Ind., burners.

Modern Equipment Co., Taunton, Massachusetts, oil, gas, and electric ovens and furnaces.

Myall-Wallace Co., Chicago., carburizing compounds and heat treatment.

Public Service Co., Chicago, gas and electric service.

P. H. & F. M. Roots Co., Connersville, Ind., blowers.

Rodman Chemical Co., Verona, Pennsylvania, carburizing compound.

Roessler & Hasslacher Chem. Co., New York, cyanide products.

Scientific Materials Co., Pittsburgh, laboratory supplies.

Simonds Mfg. Co., Lockport, New York, tool-steel.

Standard Fuel Engineering Co., Detroit, oil and gas furnaces.

Swedish Crucible Steel Co., Detroit, carburizing pots.

Strong, Carlisle & Hammond Co., Cleveland, oil and gas furnaces.

Surface Combustion Co., New York, furnaces.

Taylor Instrument Co., Rochester, pyrometers.

Tate-Jones Co., Pittsburgh, oil and gas furnaces.

Vanadium-Alloys Steel Co., Latrobe, Pennsylvania, tool-steel.

Whitman & Barnes Co., Chicago, twist-drills.

Local chapters of the Society, holding regular monthly meetings, have been established at Chicago, Cleveland, Pittsburgh, Milwaukee, Philadelphia, Cincinnati, Buffalo, Rochester, and New York. An energetic campaign for more members has been started, and in accordance with this campaign, initiation fees will be waived until the Society reaches a membership of 25,000.

Generated on 2024-09-30 01:51 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Welding Aluminum and Malleable Iron*

By F. H. SWEET

THE welding of aluminum requires considerable skill and experience before successful work can be expected on intricate parts. The method of making the weld is slightly different from that used on welding cast-iron, because when aluminum is heated, an oxide film is formed, which prevents the metal from running together and forming a suitable weld. To overcome this, the aluminum filling rods must be inserted and moved about rapidly in the molten aluminum that is being welded, in a manner similar to puddling, in order to break up this oxide film and to allow the aluminum to run together. A larger tip is necessary for welding aluminum than would be required for a section of the same size of steel or cast-iron. This is because aluminum conducts heat away rapidly. A flux has been developed for use in this work. It will be found valuable for breaking up the oxide film. In fact, by using a flux, bosses can readily be built at any desired point. This is something that could not be done before a flux for welding aluminum came into use.

Precautions should be taken to have the work securely fastened; for instance, when welding a hole in the side of a crank-case, it is customary to clamp a shaft approximately the size of the bearings (plus the thickness of the cast-metal bearings, which will melt during preheating), into the crank-case bearing-supports, in order to ensure alignment of the bearings. Angle-irons are bolted to the flanges where connection is made to the other half of the crank-case in order to ensure alignment of this part.

It is good practice to place a sheet of paper on the inside of the case next to the crack to be welded. This paper prevents the fireclay from getting into the crack. Upon this is placed fireclay in plastic condition, which is held in place by means of asbestos fibre. This makes a light backing or mold for the case and can be easily handled without fear of the mold or core being so heavy as to break down the case when heated for welding. This mold should cover a sufficient area around the crack so that the aluminum will not break down.

Aluminum parts must always be pre-heated and handled in a similar manner to that used for automobile cylinders, with the exception that aluminum should not be heated to such a high temperature, because within 50°C. of the melting point, the metal is brittle and weak. It is customary to heat these cases thoroughly until they will melt half-and-half solder in wire form. This temperature is about right to prevent cracking occurring on account of contraction and expansion and at the same time, the aluminum will possess sufficient strength so that with ordinary handling no trouble is experienced with alignment or from failure of the part.

In preparing for welding malleable iron, parts are handled in much the same way as cast-iron parts. It is customary to reinforce the malleable-iron weld as much as possible by building up the section at the fracture. The filling material used is usually nickel-steel in the bottom of the weld, finishing the top surface with cast-iron rod. The latter runs better and makes a smoother finish.

In some instances you may find that the fracture will be through a tapped opening, in which case it will be necessary to cape this part out entirely, making a much larger opening than the hole itself and then filling this with cast-iron, using the same precaution required in welding cast-iron in order to have this part soft.

Wherever the union is made between the filler used and the malleable iron, you will find the material so hard that it will be impossible to drill or machine in any way except by grinding.

The preparation of brass and bronze castings for welding is similar to that for cast-iron castings. The fracture must be caped out so that the welding can start at the centre, the groove being filled with metal melted from the filling-rod. The filling-rod should be of approximately the same composition as the part to be welded. Brass should never be used as filling material for bronze castings if a strong weld is required. Powdered borax or boric acid may be used as a flux. A mixture of one-half borax and one-half boric acid gives good results. In welding brass or bronze the work is carried out as for welding cast-iron. The metal surrounding the groove is melted and the filling material added, drop by drop, as it is melted from the rod. Be sure the metal of the casting is in a molten condition, otherwise an imperfect weld will result. Brass welds can be spoiled easily by burning the zinc out of the composition. Care should be taken not to heat beyond the melting-point. Flux should be used freely. If the welded portion has been burned, it will be exceedingly porous.

Be sure the welding flame is neutral. Be sure the part to be welded is set up properly. A poor set-up may spoil the best weld for practical use. Proper heat treatment before and after welding is as important as good welding, when intricate castings, such as cylinders and crank-cases are being repaired. Avoid hard spots in cast-iron welds by pre-heating before and annealing afterward.

*Abstract from 'American Drop Forger'.

Generated on 2024-09-30 01:52 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Pyrometry and Steel Manufacture*

By A. H. MILLER

IN the operations of melting, forging, and heat-treatment, if the product is to be of the best quality each operation must be carefully followed through. A high-quality product cannot be obtained even with the best heat-treatment if the steel is poorly melted, and, conversely, the best steel ever made may be spoiled by inefficient heat-treatment. To perform the best work in any of these operations, temperatures must be accurately regulated.

In the regulation of steel-melting temperatures, open-hearth furnaces will be taken as presenting typical difficulties in temperature determination. If accurate methods of temperature determination can be evolved for use in the open-hearth furnace, the same methods will be as successful in the crucible or electric-furnace process. Possibilities as to methods are: by means of optical pyrometers, by means of thermo-couples, and by means of arbitrary standards, which may possibly employ either of the other two methods as an auxiliary.

With optical-pyrometer determinations, the drawbacks are the lack of 'black-body' conditions in the furnace and especially the difficulty of observing the steel in the bath. The slag covering of the bath may differ in temperature from the steel by as much as 200°F. and the walls or roof of the furnace may show even a greater variation. Temperature determinations by means of the optical pyrometer may be made on small samples of the steel lifted from the furnace and poured with the pyrometer sighted on the stream, making allowances for cooling after the metal is taken from the bath. A series of such measurements should be taken to obtain an approximation of the temperature of the bath. Another method of obtaining similar measurements is to lift a spoon of metal from the bath and pour it immediately into a small test-mold, readings being taken on the surface of the metal in this test-mold at definite intervals of time until the surface of the metal freezes. It is probable that these two methods reach as close an approximation to an accurate bath-temperature as we may at present obtain.

The use of the thermo-couple in determining open-hearth furnace temperatures is attended by the difficulty of inserting the thermo-couple to the point at which the temperature is desired. The platinum-platinum-rhodium couple seems to be the best of any in common use but it is probable that, even with the best protection from furnace gases the calibration will change a prohibitive amount at the high temperatures used. The best use for the thermo-couple seems to be the secondary one—of obtaining temperatures elsewhere than in the bath itself, and deducing temperatures of the bath from these. The method of placing the thermo-couple in the slag-pocket and at various points in the checkers and at the base of the stack has been tried, but because of variations in the furnace operation it is not believed that bath-temperatures can be deduced accurately in this way, although useful knowledge as to the working of the furnace may be obtained. The use of arbitrary standards is common. Metal may be poured from a test-spoon into certain standard molds and the temperature of the bath deduced from observing this metal.

All of these methods present numerous inaccuracies, and it is doubtful whether, in the present state of pyrometry, any of them can equal the accuracy with which an experienced melter can estimate the bath-temperatures. It has been found that such a melter can estimate temperature changes within 10° to 20°F. It is true that this estimation of temperature differences is far from being the same thing as the estimation of temperature, as the results cannot be recorded for reference nor can they be transmitted from one plant to another or even from one man to another. It is also true that the 'condition' of an open-hearth bath depends on other things than temperature; such things as the state of the slag, the amount and quality of the additions, and the time factor, which is of quite as great importance as the temperature.

At present, while the determination of temperatures in open-hearth and other steel-melting furnaces is desirable, it is doubtful whether such determinations as can be made are equal in accuracy to the estimates that can be made by an experienced steel-melter.

It is fortunate that in the melting and pouring of open-hearth steel certain natural phenomena give temperatures with great accuracy, that are a close approximation to the desired temperatures. During the first part of the melting, while the first elimination of impurities is in progress, it is well to have the temperature as high as possible, consistent with safety to the furnace. The melting point of the firebrick in the furnace-roof is therefore a close measure of the temperature

In the melting and pouring of open-hearth steel certain natural phenomena give certain temperatures with great accuracy, which are a close approximation to the desired temperatures.

*Abstract of paper to be presented at the September meeting of the American Institute of Mining and Metallurgical Engineers.

Generated on 2024-09-30 01:53 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

to be attained. A skilled operator can, by observation, determine the point where the firebrick will glaze slightly but will not actually melt, and will run his furnace to this heat. In teeming a heat, on the other hand, correct temperatures of pouring may be accurately regulated by the appearance of the film or crust that forms on the surface of the metal rising in its molds. The appearance of this film is quite characteristic and, with practice, the temperature, or rather, the fact that the metal is at, above, or below the correct temperature, may be accurately stated. It may also be regulated at this point, to a certain extent, by varying the rapidity of pouring, according to the appearance of the metal rising in the mold. By careful observation of such natural phenomena, temperature differences may be estimated to within 10° to 20° Fahrenheit.

The optical pyrometer seems to be the best type for measuring forging temperatures. With some of the later improved types, temperatures can be determined within 25°F. in ordinary works practice. To reach this accuracy, the operator must have had a certain amount of experience (two weeks is ample for a man of average intelligence) and must sight his instrument on parts of the forging that will give an approach to 'black-body' conditions. He must avoid the influences that will cause inaccuracies in his readings; such influences, for instance, as a flame playing so that it will be reflected directly from the piece to his instrument or the presence of smoke in the furnace. In a good forge-furnace, this is not difficult to do.

The optical pyrometer, in particular, gives results greatly superior to those obtained by estimation by the most skilled forge-man.

The proper forging temperatures of various grades of steel differ quite widely. A skilled heater can, by observation, regulate his forging temperatures fairly well; he cannot, however, reach the uniformity and accuracy that may be attained by the use of the optical pyrometer, which stands in a class by itself for the regulation of forging-temperatures.

The temperatures involved in the heat treatment of steel objects must be accurately determined and uniformly followed. These temperatures are within the range that is difficult to estimate by the eye and at the same time they must be most accurately followed. Most of the higher grades of steel require treatments that involve a quench; most of the alloy-steels require a preliminary treatment before the final quench is given and also a drawing treatment after the quench. With the preliminary treatment, which is ordinarily between 1550° and 1650°F. the limits of accuracy are not so close as they must be in the final quench, which, for the purpose of obtaining the best possible grain-refinement, must be above the critical temperature but as close to it as is possible. The temperature of the draw, also, must be accurately approximated, especially if the results desired are to obtain the maximum possible softness. Optical pyrometers have been used in the determination of heat-treatment temperatures, but with mediocre success. The general tendency has been to rely entirely on thermo-couples for this work, at least for temperatures above 900°F. For lower temperatures, if the pieces are small enough to be treated in a bath of oil or melted salts, a direct-reading gas or vapor-expansion thermometer is simple, accurate, and gives but little trouble.

No amount of care and experience in heat treatment will enable the operator to obtain as good results without a pyrometer as he can with one. The thermo-couple pyrometer is generally used in heat treatment.

'English as She is Wrote'

The following is an exact copy of a circular letter recently received from a Japanese magazine agency:

"Dear Sirs,

It need no mention that at the return of peace the most important thing confronted us is to solve the problems of reconstruction, utilizing the power of all the sciences and arts which have made a remarkable progress during the period of war, and the people of all classes alike are very much desirous to obtain the fullest informations through publications. We have therefore good reason to believe that the reading circle of Japan will show an unprecedented striking feature in this new epoch.

"Making the most of this favourable chance, we intend to *extend our annual Autumn display of periodical specimens* to what we can in our power in order to meet on one hand with the increased needs of numerous subscribers and on the other to make as wide sale and publicity as possible of your periodical publications with renewed effort.

"Since it is for our mutual benefit, we would ask you to *kindly send by return of mail one copy each of free specimens* to us at five addresses as per the labels herewith and *return the enclosed card with blanks filled up.*"

Lord Londerry tells the story of a smart lad whom one of his keepers caught one day fishing:

"You mustn't fish here," he was told; "these waters belong to Lord Londonderry."

"Do they?" said the boy. "I didn't know that." And promptly laying aside his rod he took up a book and commenced reading.

The keeper therefore departed, but returning the same way about an hour or so afterward, he found that he had started fishing again.

"Didn't I tell you that this water belonged to Lord Londonderry?" he shouted.

"Why, you told me that an hour ago," retorted the youngster. "Surely the whole river don't belong to him: his share went by long ago."—Los Angeles Times.

Generated on 2024-09-30 01:50 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Tuberculosis and the Metal Trades

By J. Ray Johnson

OUT of every 1000 deaths in the United States, 101 are caused by tuberculosis. Out of every 1000 deaths among farmers, planters, and farm laborers, 87 are caused by tuberculosis. Out of every 1000 deaths among workers in the metal trades, 210 are caused by tuberculosis.

The large proportion of metal-workers that fall victim to this particular disease is attributed mainly to exposure to metallic dust. A man cannot work day after day in dust without getting some of it into his lungs. Once there, the sharp and cutting edges of tiny metallic particles scratch and wound, thereby opening the way to infectious bacteria, causing many diseases, particularly tuberculosis.

In a bulletin issued by the United States Department of Labor, Frederick L. Hoffman says:

"The injurious effects of exposure to metal dusts are reflected in (1) a comparatively small proportion of persons of advanced years in industry, (2) a high general death-rate, and (3) a very high specific rate from consumption and other respiratory diseases."

Other investigators and students of mortality statistics have reached the same conclusion. Insurance companies have compiled comparative tables that agree closely with those given out by the Federal government. The fact is established, and the thing to do now is to protect the metal workers against the dust that menaces his health and life.

Four methods of protection have thus far been devised. First, prevention of the formation of dust; second, isolation of the dust-producing process; third, removal of dust at its point of origin; and, fourth, personal protection of the worker.

One method of preventing the formation of dust is the addition of water, oil, and other appropriate liquid wherever possible. The wet process of grinding is highly commended as a saver of life and health. Another method of dust prevention is to adopt closed automatic devices. Under this plan the work is performed in closed chambers or drums, thus protecting the worker, as personal supervision is all that is required.

The dust-producing process may be isolated by dust-tight walls, partitions, and doors. Sometimes the isolation can be accomplished by separating workers from the dusty process by glass partitions so constructed that the men may stand outside and do their work through openings in the glass. An example of this type of apparatus is the closed sand-blast cabinet.

Dust may be removed at its point of origin by a system of local exhaust ventilation. The solution of this problem, however, should always be entrusted to competent scientifically-trained ventilating engineers.

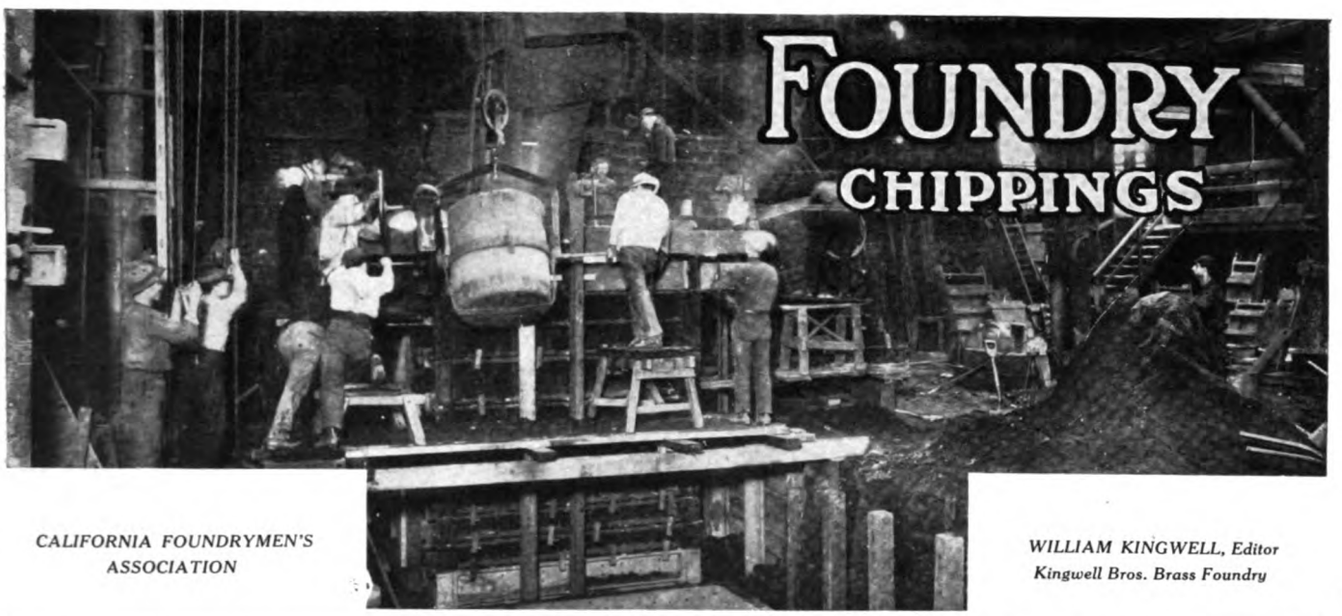
Personal protection of the worker includes the use of respirators, change of work, medical examination, and medical supervision. Workers have been known to throw aside respirators because they felt uncomfortable, and to disconnect protective devices to obtain greater freedom of action, but measures should be taken to guard against such carelessness, and the thoughtful workers, whose lives are at stake, should be the first to report infractions by the thoughtless. As to change of work, that can be regulated by making such changes when they are advised by the medical supervisor.

The problem of what is to be done with the worker who is found to be tuberculous should also be left to the medical expert. Naturally the afflicted man, who has spent years at a trade, wants to work where he can still find use for his dearly-acquired skill. It may be possible in some instances, after a course of treatment, for him to take up another branch of his trade under improved conditions, but more likely he will have to go into another calling where his weakened lungs will not be subjected to dangerous irritation.

General sanitary measures, such as are required in all well-regulated places of employment, have not been mentioned in this article, as it is assumed that such requirements are fulfilled. A word of warning, however, is advisable against the practice of careless spitting, for that is the most dangerous factor in the spread of tuberculosis. Cuspidors should be provided, and these vessels should contain a mixture of carbolic acid and water, a tablespoonful of acid to a pint of water.

Equally important in the conservation of the metal worker's health are comfortable home conditions, well-ventilated living and sleeping rooms, a bath always ready for use, and good food properly cooked. In no other way can the worker keep up his powers of germ-resistance. Indirectly he can help himself materially by contributing to building up the community's resistance powers, an invaluable work that is being done by education, demonstration, and prevention by the National Tuberculosis Association and its 1500 affiliated State and local organizations. This work is financed chiefly by the sale of Red Cross Christmas seals, and by buying these seals the metal-worker is investing in the best kind of protective insurance, for the stronger the community's power of resistance, the fewer the victims of tuberculosis among metal-workers.

Generated on 2024-09-30 01:50 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN



The Electric-Furnace in the Gray-Iron Foundry

'Duplexing' the electric furnace with the cupola for the production of certain special kinds of castings was recommended by George K. Elliott, chief chemist for the Lunkenheimer Co., in a recent address before the American Electrochemical Society. The kinds of castings where this is advisable include the following: First, castings where unusual tenacity, solidity, or other physical properties are required. A conspicuous example of this class is the high-pressure valve. Second, castings that are difficult to run on account of having thin sections and relatively large sizes. Third, castings of high quality, where foundry cost is a small part of the total cost of the finished article.

The two prime qualities most desired in high-grade gray-iron are strength and solidity, properties that usually are concurrent. Gray-iron behaves most satisfactorily under compression, worst under impact and vibration. Between these stresses come transverse strains and tension. As a rule, where castings of unusual strength are required, it will be found that they will be subject to impact, vibration, or tension; in other words, conditions where cast-iron is at its greatest disadvantage.

Solidity is an excellent goal for the aspiring foundryman; but in trying to obtain high specific gravity, he should beware of making, instead of gray iron, mottled or white irons, which are likely to have their impact strength impaired by brittleness and to be so hard as to be difficult to machine.

Strong irons have high melting points and minimum fluidity. They therefore require high pouring temperatures. Medium and high phosphorus irons have greater fluidity at lower temperatures, but they are relatively weak and brittle. While the cupola is, and probably always will be, the best furnace for melting such irons, which are suitable for most ordinary castings, it is not a success for producing the higher melting-temperatures required for a really strong iron, and it is useless as a refining furnace.

When it becomes necessary to obtain hotter iron than the cupola will produce, there are two alternatives. One is to replace the cupola entirely with a better superheating furnace, and the other is to supplement the cupola with a furnace better adapted to superheating. Because of the superior economy of the cupola for preheating and melting, the second course is the best. This involves the extension of the duplex process in common use in steel foundries to the iron foundry. Among the possible types of furnaces that can be used to supplement the cupola, the most important are the reverberatory furnace, the regenerative furnace, and the electric furnace. Of these, the electric furnace appears to be the best.

If superheating is all that is required of the electric furnace, it is probable that an acid lining is best, but if refining is also required, a basic lining should be used, since the refining possible with an acid lining is confined to the relatively small amount caused by the reducing atmosphere. In the basic-lined furnace, on the other hand, by the time the charge has reached the pouring temperature it is refined. The sulphur, in particular, can be reduced to almost any extent desired, thus eliminating one important cause of unsoundness, and also of sluggishness of metal. Iron coming from the cupola with 0.1% sulphur, after undergoing about 25 minutes heating in the electric furnace with the proper reducing slag, will contain not more than 0.03% sulphur.

Regulation of carbon, total as well as combined and

Generated on 2024-09-30 01:57 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

graphitic, can be obtained in the electric furnace. By placing steel scrap in the furnace before adding the molten iron from the cupola, total carbon can be reduced to any extent desired. By varying the silicon, the proportion between the combined and the graphitic carbon can be varied at will. In this way, a semi-steel of reliable composition can be produced.

Another advantage of using the electric furnace is the feasibility of making furnace additions of manganese or other substances for special purposes. There is no manganese loss. In fact, duplexing the electric furnace and the cupola permits complete control of the mixture.

At the Lunkenheimer plant at Cincinnati, a basic-lined Heroult furnace is used in the foundry. The following is a good example of everyday practice. An ordinary mixture of pig-iron and foundry scrap was melted as usual in the copula, transferred to the basic electric furnace and there superheated and refined under a lime slag. The untreated iron was of a composition regularly giving standard 'arbitration' test-bars that broke under an average transverse load of 2950 lb. with a deflection of 0.1 in. After treatment in the electric furnace, the iron gave bars breaking at 4400 lb. with a deflection of 0.115 in. The specific gravity was increased from 7.1 to 7.25. The furnace treatment took 25 minutes and the current consumption was 104 kilowatt-hours per ton.

It is suggested that it may be possible to duplex the blast-furnace with the electric furnace, and to produce high-grade gray-iron castings at a price but little higher than of ordinary cupola iron.

Low Sulphur Pig From Chinese Ores

The Lung Yen Mines in the province of Chili, not far from Peking have a probable supply of 40,000,000 tons of ore. The company is controlled by Chinese capitalists, who are interested in the Peking-Suiyuan railroad. The present production exceeds 600 tons per day of 50% ore. About 40,000 tons of ore has been smelted at the Hanyang Iron Works, in order that the peculiarities of the ore might be studied before purchasing blast-furnace equipment. The following analyses have been made of two grades of iron produced from the ore by the Hanyang works.

No. 1 Foundry Iron

	%		%
Silicon	2.0 to 2.5	Sulphur	0.02 to 0.04
Manganese	0.75 to 1.0	Phosphorus	0.3 to 0.4

Special Iron

	%		%
Silicon	3.0 to 6.0	Sulphur	0.02 to 0.04
Manganese	0.75 to 1.0	Phosphorus	0.3 to 0.4

It is expected that blast-furnaces will be in operation at the mines early in 1920.

Tempering Sand*

Molding sand is composed of fine grains of silica, with a certain amount of clay that acts as a bond or binder. Tests have shown that the best molding-sands are composed of grains of sand of approximately uniform size, and that the best clay must be what the potter calls 'fat' and what the chemist calls highly colloidal. A clay in this condition has been changed by organic or plant matter in the soil in such a way that it has associated with the mineral constituents of the clay a large amount of water, which is chemically combined with the mineral matter. When such matter is exposed to heat, as in pouring the castings, a certain amount of the moisture is expelled, and the clay will not regain its full binding power until this has been replaced. We all know that when we put a dry sponge into water it takes a certain amount of time for it to absorb the moisture. The same is true of colloidal clay. This explains why it is that it takes a definite length of time to temper molding-sand. In other words, there has to be sufficient time for the moisture to sweat through the sand and be taken up by the clay, and thus bring the clay to its best bonding condition.

For brass molding we use a very fine sand, such as No. 0 or No. 1 Albany. For steel molding we use a coarse sand and bond it with fireclay, and in a cubic inch of such material there may not be over one-eighth as many sand grains as in the fine Albany brass-sand. If the molding sand contains clay acting as a bond between the grains and this clay in turn has to have a certain amount of moisture, the total moisture required is proportional to the number of contact points between the sand grains, and hence the fine sand will require much more water than the coarse sand. Certain coarse steel-foundry sands require less than 3% of moisture properly to temper the material, while in certain brass-sands more than 10% of moisture may be required to give results that will be equally satisfactory.

The moment that the necessary amount of moisture is exceeded, you will have in the sand water that is not absorbed by the clay, but which is present as free water between the sand-grains. The trouble with this free water is that when you pour the casting, any water held by capillary attraction between the grains and not absorbed by the clay is more readily acted upon by the heat, and will cause blows more quickly than that which is associated with the clay.

With a fine sand the excess of water causes a sudden generation of steam, which in turn disturbs the surface, momentarily isolating grains on the face and giving these grains a chance to burn into the face of the metal. Hence too wet a sand causes a rough-faced casting. On the other hand, too dry a sand may cause cutting of the face of the casting by the flowing metal, and this also gives it a rough surface with the danger of a spoiled casting.

*Abstract from 'Foundry World'.

Generated on 2024-09-30 01:52 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Book of a Thousand Excuses for All Persons Connected With the Foundry Trade

CHAPTER IV

DRAYMEN'S EXCUSES FOR NON-DELIVERY OF CASTINGS ON TIME

THE draymen hold the key to the entire situation, for if the castings are not delivered, it would be just as well had they never been cast. The drayman has the most fertile field for excuses of any activity connected with the foundry trade. The draying business is a sure-thing gamble for the drayman. He not only hauls the material to the shops but also hauls it away again.

It is unnecessary for him to keep any books or records. If he will keep a few hundred pounds of pig, sand, coke, etc., from each load hauled, he has all the records necessary for a profitable business. This system might be varied by dumping every third load in his own yard and charging up the cartage to the customer.

In the old days around the Bay district, if some fellow decided to enter the foundry-draying business, he simply found a long rope, walked out to the bone-yard, and bought a few old skates that had been sent out there for fertilizer, dragged them back to town and tied them to a tree at the corner of Third and Howard street, went down to Whitewash Law's junk shop and found a few ancient gun-carriages or Roman chariots, to which by using some hay-rope, he hitched the noble steeds from the bone-yard. He was now ready for business with the exception of a crew to man the outfit. This difficulty was easily solved by bringing down some of the gang from Dinty Moore's saloon, corner of Third and Jessie streets. By cutting the drayage charge and keeping the cargo, it was not a difficult job to make a good profit.

Of course, conditions have changed considerably since the good old days. A man going into the business today must pay out many thousands of dollars for an auto-truck or trucks, after which he requires many more thousands of dollars to keep them in and out of the repair-shop. If he has but one truck in commission and has seventy-eight calls for rush delivery at the same time, it is not a difficult matter to see that it will be necessary for him to do some tall stretching and tell a number of so-called white lies. This type of lie is often productive of a very black smoke. This one-man draying business is not all that it is cracked up to be. The drayman of the not far distant future will be obliged to deliver pig, scrap, coke, etc., by aeroplane, directly into the top of some tall cupolas or into roof-bins.

The writer will not endeavor to register any of the old-time excuses such as, the horse is feeling indisposed, the teamster went on a drunk, nor the futurist excuses such as the aeroplane lost some of the feathers out of its left rear-wing, etc., but will adhere to the present line of excuses, some of which are as follows, and which we are supposed to swallow most every day.

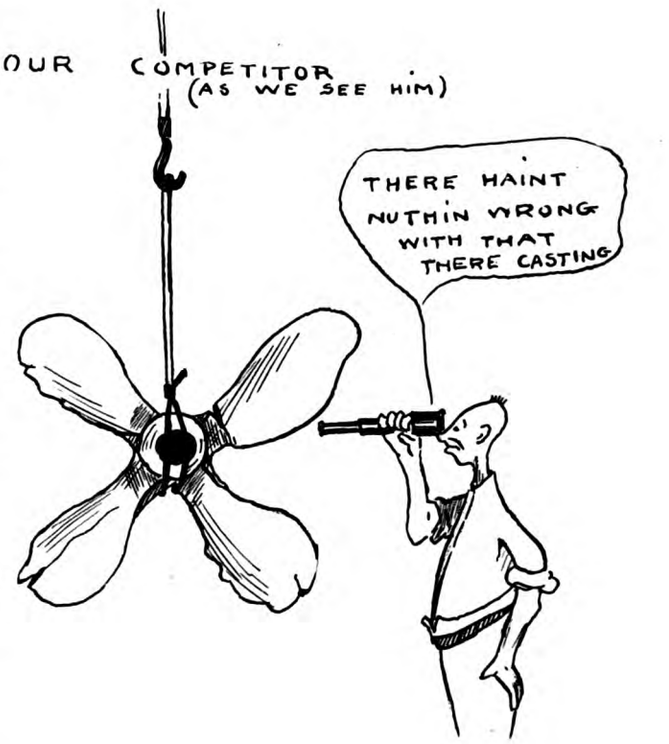
1. Axle-bearing ran hot.
2. Teamster lost his way.
3. Rear-spring broke.
4. Shipping-clerk gave wrong address.
5. Telephone-pole fell on truck.
6. Stuck in the mud on Folsom street.
7. No more grease in differential.
8. Thought it was a holiday.
9. Radiator fell off.
10. Driver stopped for drink of soda-water.
11. Gas-tank blew off.
12. Castings rolled off truck.
13. Water in gasoline.
14. Street-car smashed truck.
15. Blowout on solid tire.
16. Wheel came off.
17. Teamsters on strike.
18. Driver stopped to have finger-nails manicured.
19. Driver lost shipping-tags.
20. Bottom dropped out of truck.

The Draymen's Association has furnished its members free of charge with a booklet containing three hundred and fifty handy excuses for all kinds of delay in delivery. It is too lengthy to include in this article. Any person interested may secure a copy of same by applying to his particular drayman.

CHAPTER V

FOUNDRY SUPPLYMEN'S EXCUSES FOR POOR MATERIAL

This will be a grand opportunity for the supplyman to tell us how it happened. C. J. P. H.



Generated on 2024-09-30 01:49 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

New Problems in Melting

By C. M. GUNN

Though some of our younger foundrymen may not do so, all of the older ones must realize what great changes have taken place in melting-practice on the Pacific Coast. When California was a great producer of wheat, the 'wind-jammer' was always in evidence at our docks. Naturally, the foreign ship-owner wanted cargo both ways, so pig-iron and coke were brought over in ballast at such reasonable rates that Scotch, English, and Belgian iron and coke were practically the only materials known to the Coast foundryman.

Later the exhaustion of our soil for wheat-growing caused Europe to go elsewhere for its grain supply, which meant a discontinuance of the sailing-vessel service from our Western ports. As a consequence, though some good iron came in from the Orient, most of the pig-iron used here had to come from furnaces in the eastern States. This brought about a change not only in the iron itself, but in the grading of it, the fracture method being practically abandoned and the analysis system of the American furnace taking its place.

At the time of this change transcontinental freight-rates were fairly reasonable, but with the War came increased freight rates, necessitating a study on the part of the foundryman as to how little pig-iron he should use, and how much scrap, for scrap at that time was comparatively plentiful and had not risen to anywhere near the present prices. By the use of ferro-manganese and ferro-silicon additions, many of our foundrymen obtained remarkable results—melting as little as 15% pig-iron and 85% scrap, but the result of this has been a reduction of the former supply of scrap, until today there is such a scarcity that good foundry-scrap is quoted at prices above $40 per net ton, unheard of in the history of Pacific Coast foundry practice, but nevertheless a condition which must be met if the local foundryman is to continue in business.

This situation brings the foundryman face to face with a new problem, which is virtually the same as that of the Eastern melter, and calls for considerable figuring on the part of the superintendent who determines the charges as to how much 'off-grade' pig he should buy to mix with his No. 1, or whether he should buy a No. 2 grade and use some scrap, though less than formerly, even at the present prevailing prices.

The old idea that a foundryman works by the rule of thumb is exploded, for careful study and figuring is necessary in these days of high prices. It would seem advisable, under the circumstances, that the Foundryman's Association should devote some time to the investigation of this subject.

WARD HEELER—Are the women trying to reform politics?

District Leader—Reform nothing! They've started in to grab the jobs.—'Life'.

Cost Records and Credit Terms

By A CORRESPONDENT

Mr. Foundryman, Mr. Machine-Shop Man! Did you ever give the question of proper cost-records and credits any thought? This is a most important subject and should be given careful consideration in order to gain accurate knowledge of the cost of producing the commodity you are marketing.

First, your overhead is of prime importance. What is your monthly rental of the premises where your business is conducted? If you are the fortunate possessor of the property, what is its market value or cost, and what is the interest charge on the same? What does your accounting-clerk hire, telephone service, foremen's, superintendents', and salesmen's salary cost per month? What does your stationery, typewriter repairs, and general office equipment cost per month? What does it cost per month for upkeep in your plant? What does your power, fuel, etc., cost per month?

These are all fixed charges, which should be known to you so that they may be considered in determining your selling prices. If a correct record of these costs is kept it will be an easy matter to determine the proportional overhead charge on your volume of business.

When your selling costs are determined and your goods are delivered to the customer, your terms should not be longer than thirty days net with interest at current rates, thereafter. Mr. Machine-Shop Owner and Mr. Foundryman, did it ever occur to you who makes the profit when you extend credit without interest? There are two men. The customer primarily. Secondly, the banker to whom you go, if you haven't sufficient funds to carry these accounts.

Mr. Machine-Shop Owner, it is unfair to expect Mr. Foundryman to assist in financing your business, and it is primarily your own fault if circumstances compel him to do so. Should you be offered a job greater than your immediate resources can handle properly, you should add to your price an interest charge so that you can go out and get the money without injury to yourself or to those supplying you. The same applies with equal force to Mr. Foundryman.

In conclusion, if all those engaged in the metal trades would insist upon thirty days net cash, with interest thereafter, a great burden would be lifted from our shoulders, and there would be fewer sleepless nights trying to figure out where your next week's payroll is coming from, and where you are going to find the money for pressing bills. Gentlemen of the trade, this is a subject worthy of serious consideration and you should get together to the end that the business be placed on a safer and sounder basis.

A NEWSPAPER tells of a New York couple being married in an aeroplane. The only advantage was that they got back to earth more quickly than most newly weds.—Boston 'Transcript'.

Generated on 2024-09-30 01:52 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Competition

By JOHN E. HAX

"Competition is the life of trade."

Someone, somewhere, sometime, gave birth to that expression and sophistry, and most of us, having heard it quoted, have passed on our way without analyzing the statement. Indiscriminate price-cutting under the guise of competition will often excite the cupidity of purchasers and create a false and temporary demand. This causes ruin when persistently followed.

Then competition is the death of trade, for it puts the ignorant trader out of business and injures the business of the intelligent operator, creating conditions that constitute a permanent injury in many instances. This sort of competition is senseless for it works nothing but harm. Not even the purchaser is benefited, because he suffers loss ultimately through the general evil effect, slump in business, and consequent hard times.

Supply and demand are the life of trade and when trade becomes brisk and healthy owing to proper conditions and good times, competition becomes normal, sensible, as a rule, and necessary. True competition aims to excel in productivity, quality, and service, and demands a corresponding price and profit based on costs. Senseless competition is based on ignorance of all the true principles of business. It becomes a blind bid for orders based on a low price without knowledge of costs and no concern for the future welfare of the trade or of the customer.

There are both kinds of traders and customers in every business in every community and they are easily discernible. One business man is characterized by evidences of success, the other by those of failure. One purchaser knows that a good and reasonable expenditure secures a genuine and meritorious article and his prosperity is patent; the cheap buyer generally gets what he pays for, sometimes less, and he looks the part.

When business is normal and good, competition is a stimulus to greater effort, efficiency, economy, service, and success. It regulates charges and profits, prevents extortion, profiteering, and combinations in restraint of trade. It is therefore necessary and must be preserved under our present system.

As competition is useful and necessary when intelligent and the reverse when senseless and ignorant, it becomes a matter of great importance to study and to regulate it. Therefore, we find associations forming in various lines of business and industry for the purpose of co-operation, education in costs, and the fostering of confidence, goodwill, and courage to exact a decent and fair profit.

In periods of business depression, the state of mind of some traders and operators is conveyed by the expression 'I must keep my shop going no matter what prices I get.' This policy of trying to maintain a business or factory without regard to costs, profits, or losses soon works havoc, because it is blind stupidity, bringing calamity to the blind and losses to those more sensible. There will always be fools, as there will always be failures, but the number can be reduced. The real business man will always sit calmly by and pass up business that does not pay. He knows that his refusal to join in the wrong policy will have its influence and result. He waits and suffers the evils the other fellow inflicts, until the latter succumbs, a victim to his own lack of business ability.

Unfortunately, this is a slow process, and a deliberate and selfish as well as an unprofitable way of eliminating a troublesome competitor. It has been found more generous and expeditious to spread cost knowledge and goodwill, for there is nearly always room for all good business men engaged in any line if the conditions and market are handled intelligently.

"I would not trust any of my competitors, they are all liars" is a statement heard so often. It, of course, implies that the speaker is truthful. Just looking on as an outsider and listening to such complaints it would seem comical were it not pathetic, pathetic because there is absolutely no need for such nonsense. Business men are supposed to have business sense, horse sense, or common sense, sense that is superior to that of other people. Just now they are fighting against the demands of labor as well as fighting among themselves.

If you suggest that they might stop fighting each other, many will say it is impossible. It is not, for it is the only way success has ever been attained in any line of business or industry. It is difficult to get some people to see their own interest, forget petty animosities and false pride, but when a few wise ones start a good movement, the others follow. Business men are a lot like school boys, in fact, we are all boys grown tall. All that is actually necessary for a start in most cases is to call a meeting of business men and start a class for cost instruction. Provide a uniform system in principle and marked improvements follow, improvement even in the opinions they hold of each other. Men are not mean or liars by choice but they are sometimes by necessity or supposed necessity. Remove the needless cause of all this friction, bring about true business knowledge by the use of correct systems and principles, and business flourishes as well as goodwill. This is a fact that the fellow looking on sees so clearly, but it seems to be beyond the ken of him who will not see nor hear. He can be shown with patience.

During the last five years the foundrymen of the Bay cities have done fairly well owing to their co-operation and education but there is still much to be done and to hope for.

A NEGRO applied to a cotton plantation manager for work.

"All right," said the manager. "Come around in the morning and I'll put you to work and pay you what you are worth."

"No, suh, I can't do dat," replied the negro. "I'se gittin' mo' dan' dat now."

Generated on 2024-09-30 01:50 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Committee of California Foundrymen's Association Discusses Apprenticeship and Vocational Training

The following letter, sent by the California Foundrymen's Association to C. C. Schoen of the Training Service of the U. S. Department of Labor, was written in response to a questionnaire regarding vocational education and apprenticeship sent out by Mr. Schoen:

Dear Sir:

Wish to advise that the special committee directed to report upon the subject of foundry training as outlined by the United States Department of Labor has submitted the following recommendation, which has been unanimously adopted by our Association:

Your committee notes that both a letter and questionnaire have been sent to various foundries throughout the district; the letter outlining a series of purposes to be accomplished which would be very desirable to the foundry trade in general; the questionnaire is rather difficult to answer because it does not cover conditions prevailing in this district and as a matter of fact should be addressed to the Iron Molders Union, rather than to the employers, because with the five to one ratio of apprentices, there are many shops who would only have from one to four apprentices, and which allows an average of only one new apprentice each year of the four year training period, and if the plan were applied to the entire district of approximately one thousand molders and core-makers would mean a total of two hundred apprentices, or a total of fifty per year for the entire district.

Upon investigation, we assume that the plan originated in the Smith-Hughes act passed by the 64th Congress and which allows appropriations for the promotion of vocational education. The Towner bill introduced in the 65th Congress further provides for carrying out details of the plan.

We further find there are several foundry courses given in operating foundries at various institutions of learning wherein some molding instruction is given, with pouring one a month to twice a year. There are three in San Francisco alone and at least two have made an honest effort to promote the department under the guidance of a practical foundryman; two others at universities in this district are in good hands so far as practical construction is concerned, but with the influence of these five sources of training we can find practically no case of this training bringing the result of continuing the trade. An investigation by one of our members brings forth the general idea that the trade is not attractive, because it is laborious, dirty, monotonous, and not remunerative enough to start with.

It would appear conclusive from these results that at least the present system followed by these institutions is a dismal failure, in so far as furnishing boys for the trade, and we believe the reasons for such failure include the following:

The university courses graduate boys too old (about twenty to twenty-two) to think of taking up a further apprenticeship. The trade schools might furnish the course at the proper age for continued apprenticeship, but cannot offer an inducement toward securing a job on account of the apprentice ratio as demanded by the union, as the boy is learning a trade which he cannot pursue when his course is finished.

The plan of teaching the molding trade without frequent pouring is a mistake; as the boy naturally looses interest when he cannot see the result of his handiwork in the form of the finished product; and again there are many molds which do not improve with long standing, and the molding is apparently at fault because of delay in pouring, and which is no fault of the boys.

The average training-school attempts to teach too many branches of the business with the result that no branch is fully covered. It is certainly not necessary that a molder shall understand mixing of irons until he takes up that line as a special study. It has been general practice in many shops to start an apprentice at the core-bench and sometimes he finishes his time as a core-maker, but many shops do pursue the correct practice of advancing the boy through the various branches as fast as he will assimilate the work. We do find however that there has been so much difficulty in getting boys who want to learn the trade that laborers of advanced years have been started at the bench at more than laborer's wages; and in some shops this plan has been successful, but it is generally frowned upon by the Unions.

Your committee appreciates the needs of the situation, and believes that this Association should heartily endorse any plan which will provide relief from the present system, because we must recognize the fact that the good journeyman of the future will be hard to find, and while we do not believe that the future will need as many so-called all-around mechanics as were needed in the past on account of the coming 'age of specialists'; we do believe that our industry must enjoy the right of at least trying out any American boy who desires to learn a trade, and we do believe further that more molders are needed for the industry as a whole.

At present the ranks are full of so-called molders, who never have and never will learn the trade, and these derelicts should be compelled to step aside for those who are willing and competent to aid in the upbuilding of the art. In general we believe it is safe to say that 25% of the total molders in any one district are not competent, and are therefore a loss to the trade, and in effect constitute an industrial waste, with the result of higher costs and reduction of living standards for the whole community.

Your committee was not asked to devote its entire time in reporting upon conditions in this district, and which are detrimental to the trade as you know only too well, and it therefore offers the following suggestions for improvement, which might be transmitted to the Department if you see fit to do so.

1. The Department as its very first act should confer

Generated on 2024-09-30 01:50 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

with the International Union of the Iron Molders of North America; calling their attention to the results detrimental to the trade, which are brought about by the artificial conditions created by them to the detriment of the American boy who wants to learn a trade, and if such conferences cannot bring about free and untrammelled apprenticeship conditions, then no trade-school can possibly be a success, for the reason that the boy cannot be insured a job when he graduates.

2. The Department should readily arrange for the training of core-makers at least by establishing central core-making shops only in various foundry centres. The shop could make and sell the smaller cores, which would stand shipment, to various local foundries, as all shops could well afford to buy many of the smaller and plain cores instead of making them, and the plan would effect a great saving to the industry, as well as making it possible to operate an efficient and stable core-making department for small cores at least, and provide a partial apprenticeship with graduating privileges to larger cores and molding in operating shops. This plan would serve to start the apprentice under ideal conditions, would be self-supporting, and would weed out the poorer ones before they had wasted unnecessary time at the trade they were not fitted for, but this plan would hinge upon the first suggestion to ensure a job after say a year's experience in the central core-making school.

3. An apprentice should start to specialize as soon as possible in certain lines of work, depending upon his adaptability, as we believe this plan would develop a certain proportion of high-grade workmen; because we canot expect that all men will be alike, and the man who can successfully master any line to his liking will be offered the chance on improved work quicker by virtue of his success in any one line, than by a general training not leading to any specialization.

4. Some means should be provided for the training of handy men or machine-operators to carry on special work only, and who will become expert on work requiring large duplication, and which requires no individual knowledge or skill. This plan could be accomplished by the activities of a supervisor, instructor, or improver, (who could be a member of the Department) going from shop to shop, and arranging such class of work with the shops and the men. This service should be paid for by the shop.

5. A division should be maintained here by the Department with suitable instructors, who would move from shop to shop and co-operate with them; arrange employment and watch development of operatives, but always in the various shops.

6. A class should be organized, which would be fostered and operated by the Department and upheld by the shops or associations. This class should meet each week and general details of the trade taken up.

7. Meetings between workmen or workmen's association and the employers should be arranged and sponsored by the Department, for the purpose of working out any plans which will be mutually beneficial.

In conclusion we desire to state that all of these plans depend upon the co-operation of the unions and individual workman and we believe that without this co-operation any training is impossible, at least in this district; also we desire to state that we are not opposed to unionism in the trade; and we do not believe it should be discouraged as a prime necessity to the trade; but we are unalterably convinced that the present artificial regulations fostered and enforced by the unions are reactionary, unjust, un-American, and suicidal to the industry; and the various plans of regulating the local labor market, regardless of trade conditions, limitations of output, restrictive employment, and lack of economic understanding bid fair to wreck the business; and we are heartily in accord with any work of the Department which will bring about operative conditions between these two forces. The Department can therefore bring about the greatest results by first providing a job for the boy, then train him under actual working conditions, then helping to better his condition while he is working and by means of night-classes.

If the Department can cover this ground, it will be a blessing to the industry and the country at large, and under these conditions this Association should support it to the limit.

The Local Scrap Market

With the signing of the Armistice, California foundrymen heaved a sigh of relief and looked forward to the dawning of better conditions in the scrap-iron situation, but awoke after a few months of peace to find that the experience gained by the dealers during the War had left impressions with them that they could use to good advantage for all future time. During the War, when the iron industry was being driven to the limit all over the country, scrap-iron was undoubtedly cleaned up with a fine-tooth comb in some districts, and dealers were able to demand prices approximately equal to No. 2 pig-iron.

Having once obtained these prices, they now seek to maintain them by not carrying any stock, by keeping the foundries running from day to day with small deliveries, and by encouraging them to bid against each other.

There is no valid reason why scrap-iron in this district should sell for more than in the Eastern market provided the foundrymen would give the amount of attention to purchasing material that the matter deserves, but just so long as they are willing to trust implicitly to the tender mercies of the local dealers, they will pay about $16.80 per ton more than is justified.

There is now no real shortage of scrap. Supplies in plenty are available at some distance, which could be brought here at much less than the present prevailing price.

It is high time that foundrymen co-operated to effect some change that might regulate and stabilize this product.

C. M. H.

Generated on 2024-09-30 01:55 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Scrap-Iron From the Dealers' Standpoint

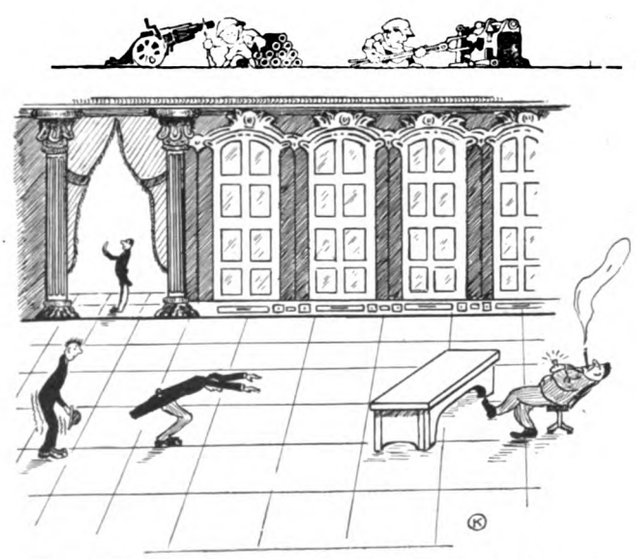
By W. H. McDANIEL

(Copy of 'C. M. H.'s' article on the preceding page was submitted to Mr. McDaniel, who kindly consented to present the dealer's side of the question).

Scrap-iron is getting scarcer every day, and, although some of the foundrymen seem to feel that the dealers have large quantities cached away in the country, the truth of the matter is that the dealer has trouble in supplying his regular customers. It has been reported several times that there are large quantities of scrap in Mexico, but so far very little iron has come from that country. Internal conditions in Mexico, together with transportation difficulties, make it impossible to depend on obtaining any supply of good enough quality to make it worth purchasing. Several lots that have been brought from there in the past proved, on arrival, to contain large proportions of steel scrap, white iron, and car-wheels.

In the past, the foundries in the country districts have been able to supply themselves from the adjacent territory, but the great demand for iron during the War took all the iron from the old mines, and the out-of-town foundries now are writing in for iron. The dealer does not know from day to day where to turn to buy the next carload of cast scrap, and he often has to buy a mixed car of inferior material in order to get a few tons of desirable scrap. Each dealer, in trying to obtain a supply for his own customers, tries to outbid his competitors, and he often finds a foundry or two also competing with him. All these conditions tend to increase the price.

The dealer's profit is not as large as is often supposed, and it is only by doing a large volume of business that he is able to come out on the right side of the ledger. If some of the foundrymen that complain of the high price of scrap-iron were compelled to work on the same margin of profit, they would probably either close up, or else revise prices upward.



In the Office of the Foundry-Supply Man. Announcing a Customer.

INDUSTRIAL EQUIPMENT

ELECTRIC INDUSTRIAL TRUCKS IN THE METAL TRADES

Modern industry demands modern tools. The hand-lathe and drill-press have been supplanted by the turret-lathe and gang-drill. The village smithy has given way to the power-hammer and the drop-forge die. The hand-molded brick has disappeared and in its place we have the machine-made product.

The haulage system is the backbone of practically any business requiring the moving of bulky or heavy materials from one place to another, and often the operation of this system determines whether or not the entire plant can be run at a profit. If the material is not transported promptly enough, the efficiency of the entire plant and consequently the production is reduced. Such conditions have made necessary the development of the electric industrial truck which, with one man driving, does the work that five or six, and in many cases twenty, men used to do with hand-trucks. Not only does the electric industrial truck spell increased speed and more production, but it is also more effective and cheaper than the man-power method. Under present labor conditions the cost of operating an industrial truck, exclusive of the driver, is less than the wages paid a man. On this basis the electric industrial truck would only have to do the work of two men in order to be lower in cost than the man-power system. Furthermore, the electric truck will operate satisfactorily on inclines, while a man must exert all the strength he can muster to keep a hand-truck moving on level ground.

Generally speaking, all electric industrial vehicles may be divided into two general classes—the tractor, which is used exclusively in pulling or pushing a load, and the truck, which is primarily intended for carrying the load, but which is frequently used as a tractor also. Of the many adaptations of these two general classes the average reader is probably the most familiar with the baggage truck used about the railroad station for carrying trunks, suit-cases, and express packages. However, this is only one use in hundreds to which these electrical industrial machines may be put, and the subject of their application is so wide that it can only be touched upon in these columns.

The Baker R. & L. Co. of Cleveland, represented on the Pacific Coast by Gunn, Carle & Co., of San Francisco, manufacture a line of industrial trucks and tractors which are examples of the better grade and type of products on the market. Realizing that the application of these vehicles to an industry is a technical problem, they have established an engineering service which, together with the several models of trucks and tractors, is known as the Baker System of Industrial Transportation.

The tractor is a vehicle of the locomotive type that carries no load itself, but is used exclusively for hauling trailers or for similar duty. In plants where the electric tractor is used, the trailers are loaded and left where the tractor can pick them up. They are coupled into trains and hauled away to be distributed in distannt parts of the plant. This miniature train has a brakeman, who attends to coupling and uncoupling the cars, and a driver, who does nothing but look after his tractor. This system, where it can be applied, is probably the most economical inter-departmental transportation system possible. With three sets of trailers, one being hauled while the two others are being loaded and unloaded, the tractor is kept constantly in operation and the greatest return is realized on the investment.

The utility truck is a 4000-lb. self-propelled vehicle. It is in effect an electric-driven motor-truck reduced in size so

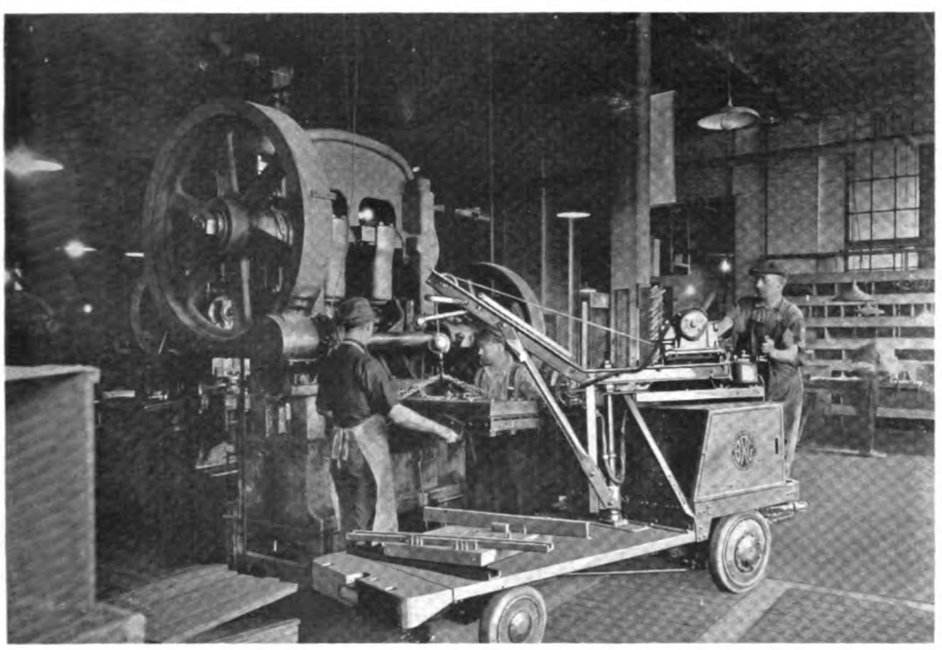
Generated on 2024-09-30 01:51 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

that it can use the narrow aisles and runways common to the average plant. It can carry a heavier load, and do it much more rapidly, than can be handled by hand-trucking methods. The operation of the truck is so simple and safe that the drivers soon become expert. On this type of truck the batteries are suspended underneath the frame between the wheels, giving a large loading platform. The utility truck is also built in a special low-platform type. This

Elevating Truck With Load of Cam-Shaft Forgings.

necessitates carrying the battery at the operator's end on top of the platform instead of underneath, but provides a loading-platform closer to the ground, which is desirable in some plants.

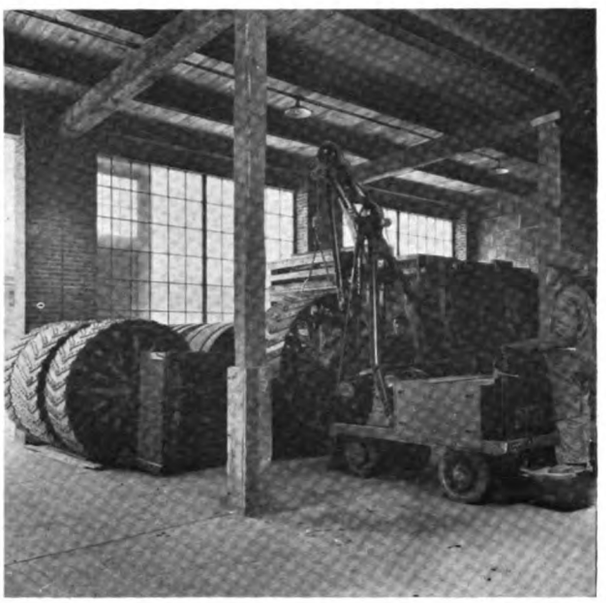
The elevating truck is designed so that it may be driven underneath a load set upon skids, automatically pick up the load, carry it away to its destination, and automatically unload. This truck is similar in appearance to the low-platform truck, but is quite different in that the platform



Placing Dies in Punch-Press With 1000-lb. Swivel-Crane Truck

may be raised or lowered through a distance of five inches by means of a control-lever on the dash. When the elevating mechanism is put into operation the platform rises vertically and lifts the load. When the control-lever is reversed it places the load back on the floor. Automatic-limit switches and a slip-clutch safeguard its action. This system is probably the most common, and is being used to advantage in many shops and factories.

Crane-trucks of several kinds are used for various types of duty. Two special crane-trucks, designed particularly for the Government, were used respectively for picking up



3500-lb. Stacking Crane

and carrying shells and for stacking the shells. The carrying-crane is designed merely to pick up heavy pieces from the ground and carry them from one point in the plant to another and is not equipped to lift these parts to any height. The stacker-crane has an adjustable boom and can lift loads of 4000 lb. as high as 12½ to 13 ft. These crane-trucks have large battery-capacity, and both the crane-motor and the truck-driving motor receive their power from the same source. Another type of crane is used for loading the truck to which it is attached. This is more commonly found in the application of a 1000-lb. or 1500-lb. swivel-crane to a low platform-truck. This makes a satisfactory vehicle for use in shops where large castings are to be carried from one machine to another.

For handling all types of bulk materials a truck with a hand-dumping body is provided. This body has a capacity of one yard and is easily dumped by hand. This truck is particularly useful around boiler-rooms for handling coal and ashes and for handling concrete aggregate and similar duty.

The severe conditions under which electric industrial trucks are operated demand special battery equipment. Most of the battery manufacturers have put on the market special rugged types for this duty which are giving very satisfactory results.

For charging where direct current of 110 volts is not

Generated on 2024-09-30 01:51 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

available the most satisfactory installation is a small motor-generator set which may be purchased on the market for this purpose. These sets are arranged to automatically taper the charging current so that charging may be started at a high rate and finished off at a lesser rate, which is the best condition and aids materially in prolonging the life of the battery.

Because of the high first cost of electric industrial trucks, as compared with the cost of hand-trucks, many manufacturers are reluctant to change their systems. Hence the hand-truck is still widely used, but when an analysis of the transportation problems of a plant are made and the figures are put down in black and white, the electric truck shows an economy which is startling. There is no doubt that the adaptation of the electric truck to industrial transportation is only in its infancy, but the great success of the present installations and the increasing adoption of this system by the most progressive manufacturing concerns in the country indicate that with a wider knowledge of the possibilities of this equipment it will soon displace men with hand-trucks for departmental transportation in the same manner that the motor-truck has displaced horse-drawn vehicles outside the plant.

EXHIBIT OF ARC-WELDING EQUIPMENT AND OTHER WESTINGHOUSE APPARATUS AT THE INTER-ALLIED FOUNDRYMEN'S CONGRESS AND EXHIBIT

A feature at the Inter-Allied Foundrymen's Congress and Exhibit was the exhibit of Westinghouse electrical apparatus for arc-welding. The arc-welding equipment consists of one 500-ampere arc-welding motor-generator set and comprises a 3-phase, 440-volt, 60-cycle Westinghouse type CS motor mounted on a common shaft and bedplate with a 500-ampere 60-volt arc-welding generator. The control panel consists of a combination generator-control and outlet-panel for graphite-electrode welding. The equipment provided for the control of the generator consists of a circuit-breaker, field-rheostat, ammeter, voltmeter, and necessary knife-switches. By means of the resistance switches mounted on the combination-panel, current values from 150 to 550 amperes may be obtained in six steps. An additional outlet-panel for metallic-electrode welding is exhibited. This panel provides for current values for metal-electrode welding from 25 to 190 amperes and for graphite-electrode welding from 225 to 350 amperes.

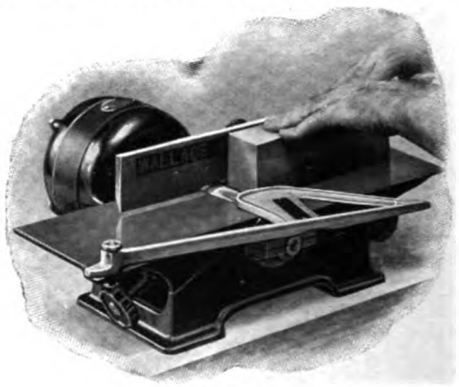
This combination provides a flexible outfit for foundry use. Comparatively heavy graphite-electrode work may be done as well as light metal-electrode welding at the same time. The generator is large enough to supply energy for several metallic-electrode welding-circuits, if no carbon-electrode welding is performed. A feature of the graphite-electrode holder is its ability to remain in continuous service for long periods of time without heating enough to be uncomfortable to the operator.

Another feature of particular interest to foundrymen is the electrically-heated metal-pattern plate for molding-machines, which provides the most convenient, up-to-date method of heating. The advantages of this source of heat as compared with gas are obvious. When the molder wishes to heat the pattern he does not need to hunt for a match, or to operate or adjust valves until the correct degree of heat is obtained. Instead he needs only to plug into the wall-receptacle. No further attention is needed, since only the correct degree of heat can be obtained.

The exhibit further includes standard AC and DC industrial motors, starters and controllers, outdoor fuse-boxes, type A and C knife-switches, oil and carbon-break circuit-breakers, Frankel connectors, standard line of meters, stationary and oscillating fans, bayonet immersion-heater, glue-pots, solder-pots, steel-clad heater, type C, and oven-heaters.

SAVING THE BIG MACHINES FOR BIG WORK

The old slow and expensive method of fitting, jointing, and surfacing is now becoming a thing of the past through the introduction of the Wallace bench-planer. In many small shops most of the fitting, jointing, and surfacing is on work less than 4 ft. long or 4 in. wide. All of this used to be done by hand at great and unnecessary expense. In the large shops, this work has been done on the stationary jointer. When this small work is done on a large machine there is not only a loss of time going to and from the machine but a loss of power in operating a large machine for work that should be done on a bench-planer, which is always at the elbow of the workman. The Wallace bench-planer is portable. The operator simply turns the switch and in a few seconds the work is done. The planer has more power per inch of knife than any large belt-driven planer. It will take the heaviest cuts in hard as well as soft wood. The machine stands on a bench or table without fastening. It is large enough to accommodate three-quarters of the power-planing done in the average shop. Stock as short as three inches can be planed with perfect safety. All machines are equipped with flap and shutter safety-guard. The Wallace bench-planer is handled by Harron, Rickard & McCone of San Francisco and Los Angeles.



The Wallace Bench Planer

DROP-FORGING AT THE KORTICK PLANT

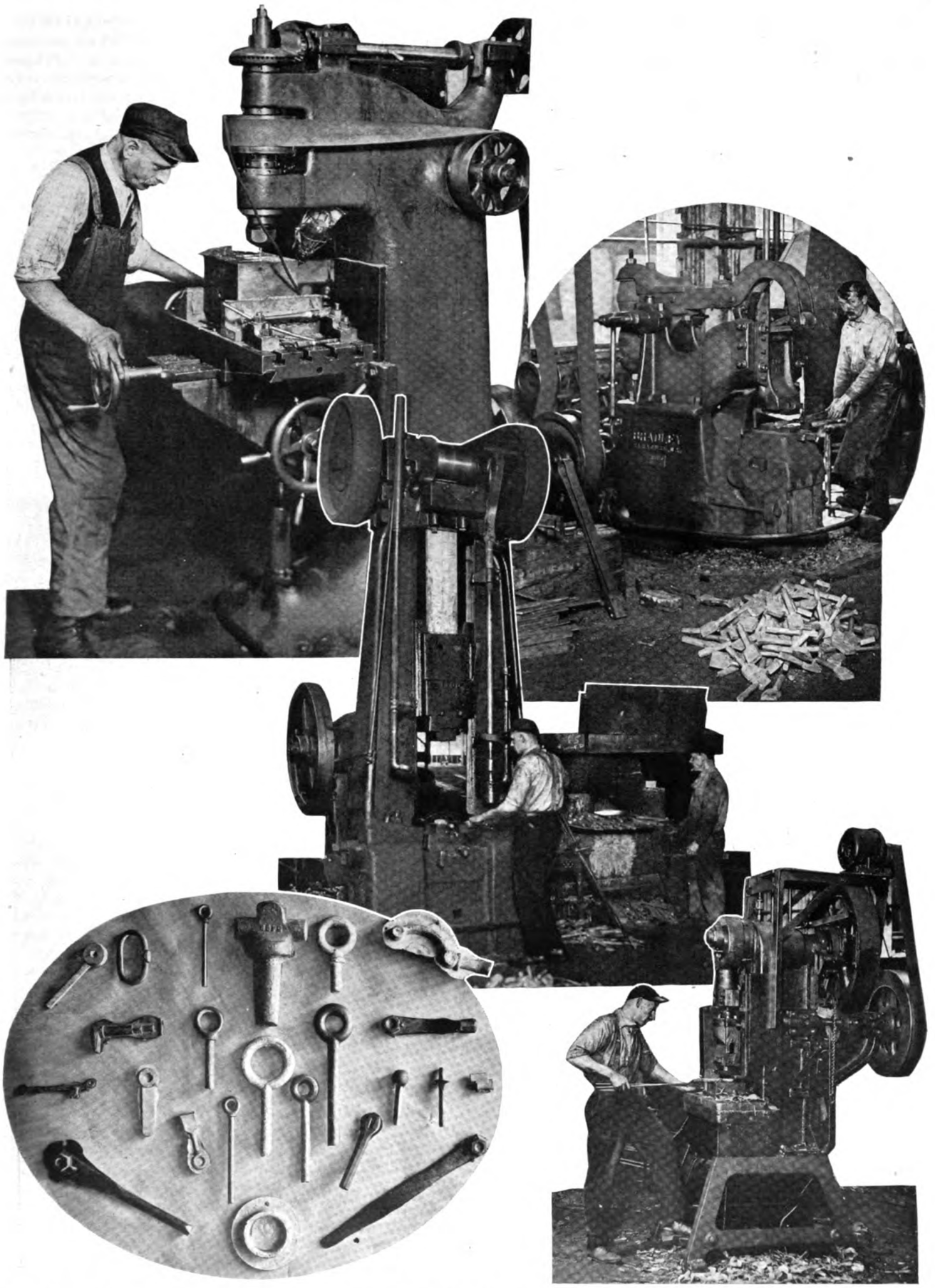
On the opposite page are shown several views of the drop-forge plant of the Kortick Manufacturing Co., which was the pioneer in this industry on the Pacific Coast. For many years general forgings, press forgings, and stampings were produced, but about two years ago, the demand from Pacific Coast manufacturers and shipbuilders for drop-forgings caused the firm to decide to specialize on this line, including both special orders and its own standard products. At the same time the plant was enlarged and the facilities increased.

The present plant covers 20,000 sq. ft., and an additional 6000 sq. ft. has just been acquired to provide room for new equipment and for material storage. The plant comprises a well-equipped machine and die-sinking shop, grinding and polishing department, finishing department, drop-forge and trimming department, press department for general press-work, such as forming, bending, punching, and upsetting, together with oil-burning furnaces and heat-treating ovens. Ample warehouse and shipping facilities are also provided.

The equipment is being worked to capacity on the manufacture of various types of drop-forgings, principally for the automobile, tractor, truck, gas-engine, and shipbuilding industries. The activity at the plant indicates that users of drop-forgings in this vicinity appreciate the advantage of dealing with a local firm and avoiding delays in Eastern shipments.

The plant is under the direct management of John C. Kortick, president of the company, assisted by O. Tusting,

Generated on 2024-09-30 01:54 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN



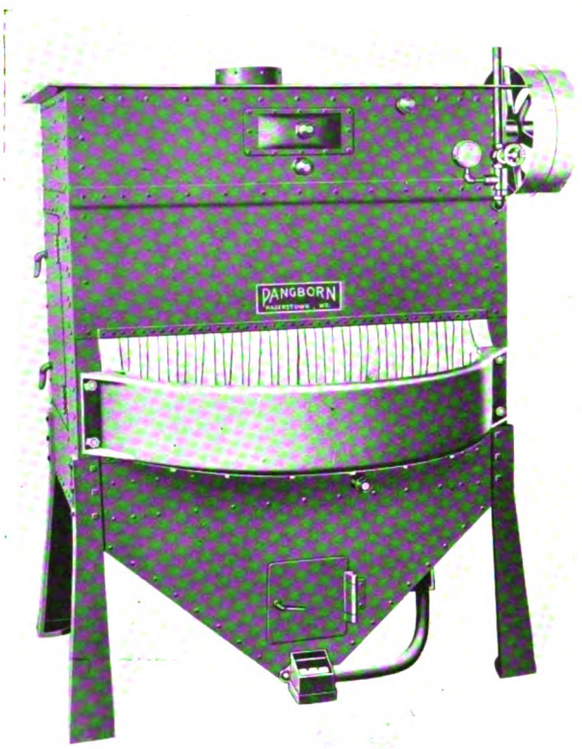
Upper left, die sinking on a Rockford vertical milling-machine. Upper right, forging eye-bolt on 1200-lb. Williams & White board drop-hammer. Centre, breaking down a forging for the drop-hammer on a 200-lb. Bradley hammer. Lower left, various forgings made at the Kortick plant. Lower right, trimming an eye-bolt on a Gilro press.

Generated on 2024-09-30 02:01 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

secretary and sales manager, and F. A. Macdonald, who has charge of production, together with a staff of assistants in the die-sinking and forging departments.

NEW AUTOMATIC SAND-BLAST FOR WORK OF LIMITED SIZE AND VOLUME

The demand for hygienic sand-blast equipment arose in the larger shops, and the first machines were naturally designed for this class of service. While some attempt has been made to meet the needs of the smaller shops, this has



Sand-Blast Table for Relatively Small Work

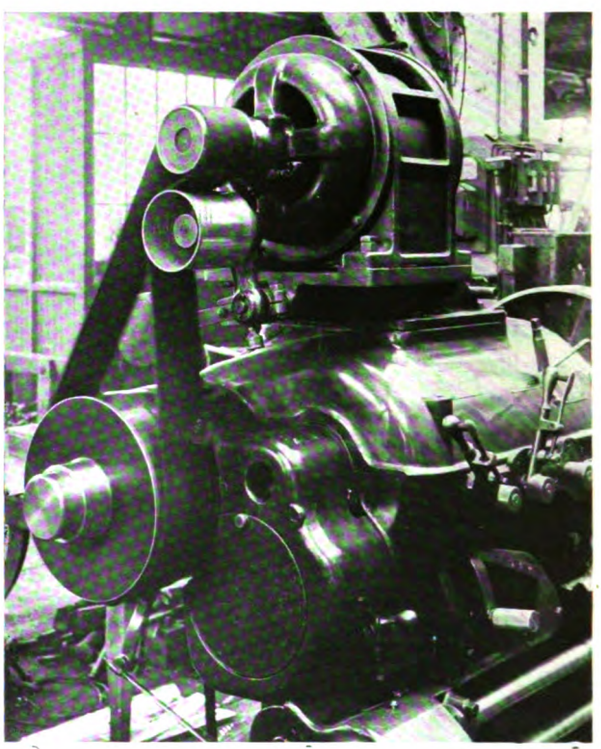
heretofore consisted largely of efforts to adapt existing equipment to these conditions, or else devices have been developed that did not provide automatic cleaning.

The success of the automatic rotary table, with its continuous operation, ability of the operator to see progress of the cleaning, while at the same time working in the open free from dust, has created a demand for a machine of this type that in size and cost would be within reach of smaller plants. The illustration shows a new machine just perfected by the Pangborn Corporation, Hagerstown, Maryland, which combines all of these features. It consists of a rotating table, half exposed, and half in a dust-tight housing in which the blasting action takes place. Work to be cleaned is loaded, turned as required, removed and renewed while the machine is in operation. The table-top is 42 in. diam. and the entire device requires a floor space of only 51 by 56 in. The sand-blast is of the suction type. The spent abrasive falls through the grated top of the table and is returned to the blasting-member in a continuous cycle.

The blast-projector takes air-nozzles interchangeably from ¼ to ⅝ in. diam. At 80 lb. pressure, the air consumption with the smaller-size nozzle is only 21 cu. ft. of free air per minute, while for driving the table only 1½ hp. is required. This makes the machine adaptable to the smaller shop as well as an auxiliary to larger equipment to meet special demands or to take care of periodical peak-loads. The table-top is provided with a guard 4 in. high, acting as a retainer for light work, which otherwise might be dislodged or blown off by the force of air. Having a 10-in. opening for passage of the work to and from the blasting-zone it is available also for pieces of some considerable size and weight. This opening, through which the pieces pass from the exposed portion to the blasting-zone, is closed by multiple sectional flexible rubber curtains, which retain the flying abrasive and dust, making the device a hygienic machine and one which is available for installation with other machine tools. The table is adaptable for either sand or metal abrasive. The weight of the machine is 1750 lb. Provision is made for connection to an exhaust system for quick removal of dust and disintegrated material.

SHORT-CENTRE BELT-DRIVE ON LATHE

An interesting application of the Meeseco 'short-centre' belt-drive is that used for operating a Lodge & Shipley geared-head lathe in the main machine-shop of the Meese & Gottfried Co. in San Francisco. A 10-hp. constant-speed motor, 900 r.p.m., is mounted on a special base on the gear-case. The distance between motor-pulley and clutch-pulley is 30 in. The resilient idler-pulley is placed on an arm that swings on a pin extending from the base-casting. The speed reduction is 3 to 1. A 5-in. light single-leather endless belt



Short-Centre Drive on Lathe

is used, which gives ample power because of the large arc contact on both pulleys, there being no waste of power through belt slippage.

As the load on the machine increases, the position of the resilient idler-pulley is automatically changed by the equalizing weight, thus increasing the arc of contact on both the motor and clutch pulleys.

In combination with the geared head, speed changes are easily accomplished by the operator. The machine is noiseless, and as the load on the lathe increases, the pulling side of the belt tightens and the slack is automatically taken up by the idler and equalizing weight, thus increasing the arc of contact on both pulleys.

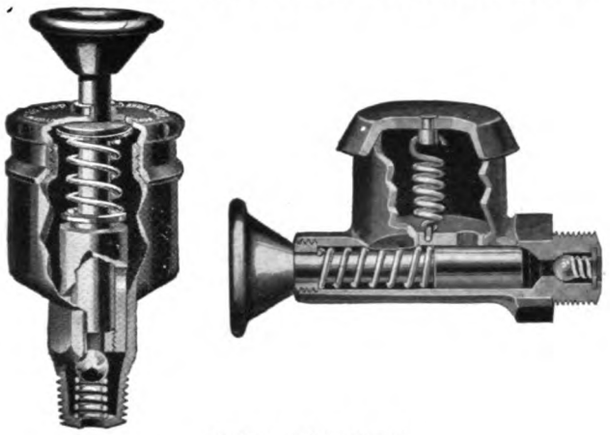
This is not in any sense a belt-tightener but a highly

Generated on 2024-09-30 01:51 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

efficient drive for any speed and power and is applicable to all standard machine tools.

'OIL-KIPPS' IN PLACE OF GREASE-CUPS

To eliminate some of the disadvantages connected with the use of grease-cups on automobiles and other machinery, the Madison-Kipp Corporation, of Madison, Wisconsin, has



Vertical and Horizontal

developed 'Oil-Kipps'. These are made with both vertical and horizontal cups, as shown in the illustration. They are filled from an ordinary oil-can. The spring-plunger is then pulled back, and the release of the plunger lubricates the part. Each filling of the lubricating-cup provides enough oil for several lubrications. All trouble from the gummy residuum from grease is avoided.

TRADE NOTES

The Best Steel Casting Co. has burned-in its 6-ton Heroult furnace.

W. H. Smith has been appointed foreman of the new plant of the **Wallace H. Dow Co.** at Petaluma.

The John B. Neumer Co., of Los Angeles, will construct a lithographing plant at Fresno. The estimated cost is $1,000,000.

The John Breuner Co. will construct a 12-story store building at Sixth and K streets, Sacramento. The estimated cost is $750,000.

The Cogswell Polytechnical College, 26th and Folsom streets, has added two 14-in. Rockford economy lathes to its shop equipment.

A. Meister & Sons have purchased a tract near the northern city limits of Sacramento and will construct a plant for making and repairing automobiles.

The General Petroleum Co. will construct a plant at Lebec, Kern county, for topping its oil before delivering the heavier parts of the oil to the Santa Fe railroad at Mojave.

C. Jory & Sons have moved their machine-shop and iron works from the corner of Aurora and Washington streets, Stockton, to the corner of Aurora and Taylor streets.

P. J. Wallace and **H. M. Cassilis** have formed the **Valley Pattern Works** with shop at 129 Steamboat levee, Stockton. The firm does a general jobbing business, especially gas-engine work.

The Dow Pump & Diesel Engine Co., of Alameda, has issued a 20-page illustrated booklet describing the principal features and advantages of the Diesel engines manufactured by the company.

The California Products Co., of Fresno, has purchased the meat-packing plant built at that place by the Universal Packing Co. and wil convert it into a vegetal-oil plant. About 600 persons will be employed.

The Chicago Pneumatic Tool Co. has moved its Seattle branch from the L. C. Smith building to 119 Jackson street, where a two-story and basement brick building has been equipped for its use.

The Leach Biltwell Motor Co. has acquired a 22-acre site for an automobile factory near Slauson and Boyle avenues, Los Angeles, adjoining the site of the Southern California Iron & Steel Co.'s new plant.

George Foraker, formerly assistant general superintendent for the Pacific Coast Steel Co., has been appointed general superintendent, succeeding **C. E. Duncan,** who resigned recently because of poor health.

The California Plating Works of Stockton has moved into a new building at the corner of Madison and Fremont streets. The firm does a general jobbing business in all kinds of brass, nickel, and other plating.

Contract for construction of a 12-story office building at Fresno for **A. Mattei** has been awarded to the **Lindgren Co.,** of San Francisco. The estimated cost is $500,000. The building is to be completed by April 15, 1920.

The Lamb Machine Co. has installed a 500-kw. Greene electric-arc furnace in its foundry at Hoquiam, Washington. The furnace will be used for manufacture of manganese-steel, carbon-steel, and special gray-iron castings.

The Byron Jackson Iron Works will establish a branch at Visalia. Besides a sales office for Madera, Fresno, Kings, Tulare, and Kern counties, there will be a foundry and machine-shop. In all about 75 men will be employed.

The Union Gas Engine Co., of Oakland, is building eighteen 300-hp. engines for the embarkation service of the United States Army. The engines are to be used on the Atlantic Coast and will be placed in concrete hulls.

The Boat Construction Co. has equipped a shop for building small and fancy boats on Jefferson Ave. between Park and Fruitvale avenues, Alameda. Herbert's Machinery & Supply Co. furnished a large part of the equipment.

Glanville Hart has taken over the tractor formerly manufactured in Oakland under the name of the **Knight-Lee** tractor, has re-named it the **Stockton tractor,** and is manufacturing the machine at 531 North Union street, Stockton.

The Skandia Pacific Oil Engine Co. has finished the first of two 1100-hp. Werkspoor Diesel engines that it is building for the Emergency Fleet Corporation. Two 550-hp. Werkspoor engines are being built for the Standard Oil Company.

Ditty Bros., Inc., have moved their offices from the Balboa building, San Francisco, to 140 Howard street, in the building formerly occupied by the Wallace H. Dow Pump Co. The change will enable the firm to have its offices and warehouse under the same roof.

The Bureau of Yards and Docks, Navy Department, is receiving bids until October 22 at Washington, Mare Island, and Pearl Harbor, for furnishing a turbo-alternator, air-compressor, boiler-feed pump, and other equipment for the naval station at Pearl Harbor.

Contract for furnishing 4500 tons of steel for the building to be erected by the **Pacific Mutual Life Insurance Co.** at Sixth street and Grand avenue, Los Angeles, has been awarded to the **Llewellyn Iron Works.** The total estimated cost of the building is $2,500,000.

C. F. Braun & Co., of San Francisco, announce that after devoting their plant almost exclusively to Government work during the past two years, they have now completed these contracts and are prepared to supply the general public with Braun auxiliary machinery of all kinds.

The plans of the **Goodyear Tire & Rubber Co.** for its Los Angeles factory have been modified. The original scheme provided for a plant with a capacity of 3000 tires per day, the present one for a capacity of 7500 tires per day. The estimated cost of buildings alone is $6,000,000.

W. H. Jahns, 2662 Lacy street, Los Angeles, is building a foundry for the manufacture of pistons and other gas-engine parts. In connection with the foundry, there will be a

Generated on 2024-09-30 01:55 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

machine shop. He will specialize on quality pistons. The contract for furnishing the foundry equipment has been given to Ditty Bros., Inc., San Francisco.

The Champion Foundry & Machine Co., Chicago, Illinois, manufacturers of the Champion electric sand-riddle, announce that effective October 10, the exclusive agency for this riddle on the Pacific Coast will be handled by Ditty Bros., Inc., San Francisco and Seattle, who will carry a complete stock of the Champion riddles at each city.

The Commercial Metal & Machinery Co. has opened a brass foundry to make its own castings, under the name of the Commercial Brass Foundry. It is at 83 Natoma street, San Francisco. Brass, bronze, and aluminum castings will be made. The foundry will use crucibles for the time being, but a brass furnace will be installed soon, permitting the manufacture of heavier castings.

The 1919 catalogue of **Sheffield Machine & Tool Co.,** Dayton, Ohio, contains a great deal of information of value to the tool-maker and tool-designer as well as describing the gauges and special thread-testing tools manufactured by the company. There are some forty pages of tables which contain the answer to almost every possible question regarding threads in a compact and practical form.

The Drake Lock-Nut Co. reports the receipts of orders for large quantities of its lock-nuts from buyers in Australia, New Zealand, Java, Siam, China, and other Oriental countries, as well as South Africa. Exclusive agencies have been placed covering South Africa, Australia, and New Zealand. Besides the company's San Francisco plant, a plant at Cleveland supplies the trade in that vicinity.

E. W. Cummings, plant and safety engineer for the **Holt Manufacturing Co.** at Stockton, is at Cleveland, attending the annual convention of the National Safety Council. On his trip, Mr. Cummings expects to visit a number of automobile factories and other industrial plants in the Middle West, studying safety devices and other appliances, including those for the mechanical handling of material.

The McCloud River Lumber Co. will abandon one of its mills at the close of the present season and will erect a new mill in its place. The new mill will be a three-band mill. Part of the mill will be driven by electricity, supplied by a 750-kilowatt turbine. The total estimated cost of the work is $500,000. F. W. Horstkotte, of Spokane, will have charge of the work, which is to be completed by April 1, 1920.

G. P. Goodman, who for several years has represented the Hisey-Wolf Machine Co. in the East, joins the **F. H. Niles & Co., Inc.,** on October 1 to take charge of their portable-tool department. F. H. Niles & Co. handle not only the Hisey-Wolf line of electric machine-tools but the Canton pneumatic hammers and drills manufactured by the Pittsburgh Pneumatic Co. in the East. Other changes in the Niles company are the appoint of F. H. Crawford as secretary and J. E. Haetten as sales manager. This company, supplying machine-tools and foundry equipment, is experiencing an increased demand for its products and is taking the necessary steps to ensure a maintenance of its adequate sales service.

The exhibit of the **Pangborn Corporation,** manufacturers of sand-blast and allied equipment, at the Convention of the American Foundrymen's Association, was even more extensive than in past years. Spaces occupied had a frontage of 80 ft. and the equipment, which was in operation, included in the various types and sizes cabinet sand-blasts, barrel sand-blasts, hygienic rotating-table cabinet sand-blasts, rotary-table sand-blasts, hose-machines, sand-separators, and dust arresters and exhausters. In addition to the operating equipment a stereoptican was used to illustrate actual installation in operation throughout the country, in varied lines of foundry and other manufacturing practice. The company was represented by Thomas W. Pangborn, John C. Pangborn, Harry D. Gates, W. C. Lytle, P. J. Potter, George A. Cooley, Charles T. Bird, Jesse J. Bowen, Roy C. Koch, J. F. Tracey, Hugo F. Liedtke, and Foster J. Hull.

An interesting 16-page illustrated pamphlet describing the recently completed oil-pipe line of the Yarhola Pipe Line Co. has recently been issued by **Sanderson & Porter,** the engineers who built the line. The Yarhola company is a subsidiary of the Royal Dutch-Shell Co. The line is 555 miles long and extends from Healdton and Cushing, Oklahoma, to Wood River, Illinois, on the opposite side of the Mississippi river from St. Louis. An interesting feature of the work was the use of Diesel engines and geared pumps in the pumping-stations in place of the more common steam-driven pumps. Copies of the pamphlet may be obtained from the San Francisco office of Sanderson & Porter, 14 Montgomery street.

One of the most interesting features at the annual convention of the National Safety Council at Gray's Armory, Cleveland, September 29 to October 4, was the exhibit of the **Westinghouse Electric & Manufacturing Co.** of East Pittsburgh, in which was shown all forms of safety devices or models designed by men of that company for use in the various departments of the Westinghouse works. The exhibit included such items as rip and crosscut saw guards, punch-press guards, safety-tongs, cable-connectors, acid-jugs, ladles, belts, vacuum-lifters and pickers for punched sheet-metal, glass-lamp reflector-guards, floor-mats, locking-devices for belt-shifters, milling-cutter guards, low-head-room elevator-guards, and other devices of a similar nature. Certain products that contain safety features were also exhibited, among them being arc-welding helmets and shields, elevator safety-devices, automobile-lock switches, motor-starting switches, multiple-circuit safety-lighting panels, safety-car panels, and safety-platform panels. W. G. Mayer, supervisor of safety appliances for the company, was in charge of the exhibit, and C. B. Auel, director of standards, processes, and materials for the company, was also in attendance at the convention.

Market Review

The beginning of October finds the local iron and steel market disturbed by two strikes. The steel strike makes deliveries uncertain, while the shipyard strike has cut off the principal source of demand. Most of the mills are running although many of them with reduced forces. However, orders for finished products are accepted with the understanding that the mills will do their best on deliveries but that the buyer assumes all risk of delay. As few furnaces supplying foundry-iron are seriously affected by the strike, the chances for obtaining early deliveries of pig-iron are better than is the case with finished products. The car shortage has made deliveries of coke uncertain. Prices, both local and Eastern, are, in general, unchanged.

There has been little change in local market for non-ferrous metals during the month, the present ruling prices being as follows:

Electrolytic copper	23.50
Casting copper	23.00
No. 1 red ingot brass	19.00
No. 1 yellow ingot brass	15.50
Electrolytic zinc	9.50
Pig-lead, carloads	6.50
Electrolytic tin	57.00 to 58.00
Antimony	9.50

Scrap, both cast-iron and steel, is scarce. Cast-iron scrap is now selling at $42.50 per ton, while steel scrap sells for $22. One dealer is reported as giving his opinion that steel scrap would reach $30 per ton before the winter is over.

Generated on 2024-09-30 01:52 GMT / https://hdl.handle.net/2027/uiug.30112007837682
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN